Variations in the Korean answering system: An experimental study

Jong-Bok Kim, Yunju Nam, & Jungsoo Kim jongbok@khu.ac.kr; yjnam05@hanyang.ac.kr; jungsookim@khu.ac.kr

Kyung Hee U., Seoul & Hanyang U.

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2 Background

3 Experiment

- Methodology
- Results
 - Overall
 - Short-form negation (SFN)
 - Long-form negation (LFN)

4 General discussion

- 5 Conclusion
- 6 Selected references

NPQs and stand-alone response particle answers

• Languages diverge with respect to how to answer NPQs (negative polar questions) with response particles: polarity-based and truth-based answering systems (Kuno 1973; Pope 1976; Jones 1999; Holmberg 2016; Moser 2018).

(1) Q: A1: A2:	Isn't John diligent? Yes. (= he is diligent.) No. (= he is not diligent.)			
(2) Q:	John-i an pwucilenha-ni? John-NOM NEG diligent-QUE 'Isn't John diligent?'			
A1:	ung. yes 'Yes.' (= he is not diligent.)			
A2:	ani. no 'No.' (= he is diligent.)			

- Polarity-based answering system: The polarity of the response particle is in accordance with the polarity of the (non)-elliptical answer sentence (i.e., yes-pos, no-neg)
- Truth-based answering system: The response particle confirms or contradicts the truth of the negative proposition evoked by the NPQ (i.e., yes-neg, no-pos)

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Complexities: negative neutralization

- This bipartite distinction for answering systems appears to be robust, but there are a variety of environments where this distinction is overridden.
- Negative neutralization (Kramer & Rawlins 2011)
 - (3) Q: Is Alfonso not coming to the party?
 - A1: Yes, (he isn't coming to the party.)
 - A2: No, (he isn't coming to the party.)
- Here, the uses of the positive particle override English's polarity-based answering system.
- Holmberg's (2013, 2016) account: resort to the position of the negation marker – high negation vs. low negation

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Complexities: contextual bias

- It appears that contextual bias also plays a key role in answering NPQs.
- As for Korean, with a negative bias NPQ as in (4), its answers follow the truth-based answering system.
 - (4) (Negative bias: seeing a friend's messy hair, and assuming she might have not washed her hair)
 - Q: achim-ey meli kam-ci anh-ass-ni? morning hair wash-CONN NEG-PST-QUE 'Didn't you wash your hair this morning?'
 - A1: ung, (an kam-ass-e.) yes NEG wash-PST-DECL (int.) 'Yes, (I didn't wash my hair this morning.)'
 - A2: ani, (kam-ass-e.)

no wash-PST-DECL $% \left({{{\rm{D}}}_{{\rm{A}}}} \right)$

(int.) 'No, (I washed my hair this morning.)'

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Complexities: contextual bias

- In contrast, with a positive bias NPQ in (5), its answers override the language's truth-based answering system and follow the polarity-based answering system.
 - (5) (Positive bias: showing a single photo where Obama is with a friend who resembles him a lot)
 - Q: i salam Obama talm-ci anh-ss-ni? this man Obama resemble-CONN NEG-PST-QUE 'Doesn't this man resemble Obama?'
 - A1: ung, (talm-ass-e.) yes resemble-PST-DECL 'Yes, (he resembled Obama.)'
 - A2: ani, (an talm-ass-e.)
 - no NEG resemble-PST-DECL
 - 'No, (he didn't resemble Obama.)'
- Examples like these suggest that proper understanding of answering systems needs to refer to the discourse structure where bias values are accessible.

Our goal of this study

- Common findings of recent studies: There are no languages with a pure polarity-based or truth-based answering system and each language employs both polarity-based and truth-based answering strategies and preferences are possible according to specific grammatical and contextual parameters available (González-Fuente et al. 2015; Meijer et al. 2015; Roelofsen & Farkas 2015; Tubau et al. 2015; Claus et al. 2017; Li et al. 2016; Li et al. 2016; Kim 2017; Goodhue & Wagner 2018).
- Our goal of this study: to investigate variations in the uses of response particles in Korean and to understand if contextual cues or other factors affect its truth-based answering system

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Two forms of negation in Korean: SFN and LFN

- Korean has been traditionally classified as a language with the truth-based answering system; however, there seem to be variations in answering NPQs with respect to several parameters.
- Two forms of negation in Korean: short form negation (SFN) and long form negation (LFN) (Hagstrom 2000; Kim 2000; Sells 2001; Sells & Kim 2006; Kim 2016)
 - (6) a. Short form negation (SFN): Mimi-nun an phikonha-ta. Mimi-TOP NEG tired-DECL 'Mimi is not tired.
 - b. Long form negation (LFN): Mimi-nun phikonha-ci anh-ta. Mimi-TOP tired-CONN NEG-DECL 'Mimi is not tired.
- SFN: the negation marker an directly attached to the following main verb
- LFN: the combination of a *-ci*-marked main verb with the negative auxiliary verb *ahn*-

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Korean NPQs with LFN

- Of these two forms, literature has noted that NPQs with LFN allow not only truth-based but also polarity-based answering systems (Chang 1975; Yang 1991; Wee 2019).
 - (7) Q: Lina-ka khwukhi-lul mek-ci ahn-ass-ni? (LFN) Lina-NOM cookie-ACC eat-CONN NEG-PST-QUE
 'Didn't Lina eat a cookie?'
 - A1: ung, (an mek-ess-e.) yes NEG eat-PST-DECL (int.) 'Yes, (she didn't eat it.)'
 - A2: ani, (mek-ess-e.) no eat-PST-DECL (int.) 'No, (she ate it.)'
 - B1: ung, (mek-ess-e.) yes eat-PST-DECL (int.) 'Yes, (she ate it.)'
 - B2: ani, (an mek-ess-e.) no NEG eat-PST-DECL (int.) 'No, (she didn't eat it.)'

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Korean NPQs with SFN

- To some speakers, however, such variations appear not to be possible with SFN (Wee 2019).
 - (8) Q: Lina-ka khwukhi-lul an mek-ess-ni? (SFN) Lina-NOM cookie-ACC NEG eat-PST-QUE
 'Did Lina not eat a cookie?'
 - A1: ung, (an mek-ess-e.) yes NEG eat-PST-DECL (int.) 'Yes, (she didn't eat it.)'
 - A2: ani, (mek-ess-e.) no eat-PST-DECL (int.) 'No, (she ate it.)'
 - B1: *ung, (mek-ess-e.) yes eat-PST-DECL (int.) 'Yes, (she ate it.)'
 - B2: *ani, (an mek-ess-e.) no NEG eat-PST-DECL (int.) 'No, (she didn't eat it.)'
- The responses A1 and A2, following the truth-based system, are natural, but those B1 and B2, which follow the polarity-based answering system, are unnatural to many.

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Korean NPQs with bias

- Little discussion about the effect of bias on the possible answer patterns for Korean NPQs; one exception is Koo (2001), which performed a small-size questionnaire-based survey using six dialogue exchanges with each one having eight questions for comprehension and selection for a more proper response
- Results: For each of the three biases, more than 90% of the 49 subjects followed the truth-based system.
- Conclusion: Bias types do not influence the preferred answer patterns for Korean NPQs.

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Participants and variables for test items

- Participants: thirty-two native speakers of Korean; all university students
- Four variables for the experimental materials
 - Three bias context types: neutral, positive bias, and negative bias
 - 2 Two negation forms in Korean NPQs: SFN and LFN
 - Two response particles: ung 'yes' and ani 'no'
 - Two polarity values of the answer sentence: positive and negative

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Materials: negative bias context

- (9) (Negative bias: seeing a dirty lab and asking if one cleaned the lab or not)
 - Q: ecey chengsoha-ci ahn-ass-ni? yesterday clean-CONN NEG-QUE 'Didn't you clean the lab yesterday?'
 - A1:
 ung, ha-yess-e.
 A2:
 ung, ha-ci
 ahn-ass-e.

 yes, do-PST-DECL
 yes, do-CONN NEG-PST-DECL

 'Yes, I cleaned the lab.'
 'Yes, I didn't clean the lab.'
 - A3: ani, ha-yess-e. no, do-PST-DECL 'No, I cleaned the lab.'
- A4: ani, ha-ci ahn-ass-e. no, do-CONN NEG-PST-DECL 'No, I didn't clean the lab.'

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Materials: neutral context

(10) (Neutral: seeing a friend eating ramen from a distance and asking if it is hot or not)

- Q: lamyen ttukep-ci ahn-ni? ramen hot-CONN NEG-QUE 'lsn't the ramen hot?'
- A1: ung, ttuke-we. yes, hot-DECL 'Yes, it is hot.'
- A3: ani, ttuke-we. no, hot-DECL 'No, it is hot.'

- A2: ung, ttukep-ci ahn-a. yes, hot-CONN NEG-DECL 'Yes, it isn't hot.'
- A4: ani, ttukep-ci ahn-a. no, hot-CONN NEG-DECL 'No, it isn't hot.'

A B A A B A

Materials: positive bias context

(11) (Positive bias: seeing a friend eating hot-steaming ramen and asking if it is hot or not)

- Q: lamyen ttukep-ci ahn-ni? ramen hot-CONN NEG-QUE 'lsn't the ramen hot?'
- A1: ung, ttuke-we. yes, hot-DECL 'Yes, it is hot.'
- A3: ani, ttuke-we. no, hot-DECL 'No, it is hot.'

- A2: ung, ttukep-ci ahn-a. yes, hot-CONN NEG-DECL 'Yes, it isn't hot.'
- A4: ani, ttukep-ci ahn-a. no, hot-CONN NEG-DECL 'No, it isn't hot.'

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Methodology

Materials (cont'd)

- Hard to construct NPQs with both positive and negative bias contexts at the same time
- Type 1: 16 sentences with a positive bias context and a neutral context
- Type 2: 16 sentences with a negative bias context and a neutral context

Table 1: Type 1 NPQ-answer pairs with a positive bias context and a neutral context

Canal	F	NDO	Answer			
Cond. FC	Form	NPQ	RP	AS	Meaning	
1		lamyen an ttukep-ni?	ung,	ttuke-we.	Yes, it is hot.	
2	SEN	ramen NEG hot-QUE	ung,	an ttuke-we.	Yes, it isn't hot.	
3	5114	'lsn't the ramen hot?'	ani,	ttuke-we.	No, it is hot.	
4			ani,	an ttuke-we.	No, it isn't hot.	
5		lamyen ttukep-ci anh-ni?	ung,	ttuke-we.	Yes, it is hot.	
2		ramen hot-CONN NEG-QUE	ung,	ttukep-ci ahn-a.	Yes, it isn't hot.	
7		'lsn't the ramen hot?'	ani,	ttuke-we.	No, it is hot.	
8			ani,	ttukep-ci anh-a.	No, it isn't hot.	

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Materials (cont'd)

Table 2: Type 2 NPQ-answer pairs with a negative bias context and a neutral context

Cand	Farma	NBO	Answer			
Cond. Form		NPQ	RP	AS	Meaning	
1	SFN	ecey chengso an ha-yss-ni?	ung,	ha-yss-e.	Yes, I cleaned the lab.	
2		yesterday clean NEG do-PST-QUE	ung,	an ha-yss-e.	Yes, I didn't clean the lab.	
3	SEIN	'Didn't you clean the lab yesterday?'	ani,	ha-yss-e.	No, I cleaned the lab.	
4			ani,	an ha-yss-e.	No, I didn't clean the lab.	
5		ecey chengsoha-ci ahn-ass-ni?	ung,	ha-yss-e.	Yes, I cleaned the lab.	
6		yesterday clean-CONN NEG-PST-QUE	ung,	ha-ci an-ass-e.	Yes, I didn't clean the lab.	
7	LFIN	'Didn't you clean the lab yesterday?'	ani,	ha-yss-e.	No, I cleaned the lab.	
8			ani,	ha-ci an-ass-e.	No, I didn't clean the lab.	

- A total of 512 NPQ-answer pairs (128 pairs for positive bias contexts, 128 pairs for negative bias contexts, and 256 pairs for neutral contexts); distribution into eight experimental lists in a Latin-square design
- One list: 64 NPQ-answer pairs (i.e., 16 positive bias context pairs, 16 negative bias context pairs, and 32 neutral context pairs) composed of eight different conditions + additional 128 question-answer pairs (64 appropriate and 64 inappropriate pairs) as filler items
- Divided these 192 experimental items (64 target and 128 filler items) of one list into two sets and assigned the two sets to the subjects in a randomized order

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Procedure and analysis

- Platform: a Korean free online survey platform, the MOA form (https://ko.moaform.com)
- Participants were instructed to judge the acceptability on a 1 to 7 scale for the answer (B's utterance) following A's NPQ under each given particular bias context.
- Overall, linear mixed-effects regression + *t*-test for the simple main effect when there was an interaction effect between variables

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Results

Overall results

- A significant main effect of 1) the negation form (NF) (p < .001), 2) the negative bias context (Negative Bias) (p < .001), 3) the response particle (YesNo) (p < .001), and 4) the polarity of the answer sentence (PosNeg) (p < .001)
- Additional significant interaction effects between the negation form variable and other variables
- Implications: The main effect should be interpreted differently according to the negation form, and the interaction effects need to be resolved one by one.

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SFN: mean acceptability ratings with standard error bars



Figure 1: Mean acceptability ratings of the answer patterns for Korean NPQs with SFN along with standard error bars

- Overall similar patterns in the three bias contexts: mismatching answer pattern > matching answer pattern (i.e., Yes-Neg > Yes-Pos, No-Pos > No-Neg), following the truth-based answering system
- Some bias effects: mean acceptability differences in some pairs of answer patterns in the three bias contexts

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SFN: statistical analysis

Table 3: Results of the statistical analysis concerning the variables for Korean NPQs with SFN and their answer patterns using linear mixed-effects regression (Signif. codes: 0 '***' 0.01 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1)

	Estimate	Std. Error	df	t-value	Pr(> t)	Signif.
(Intercept)	3.398	0.202	135.516	16.827	< 2e-16	***
Negative Bias	-0.242	0.264	976.695	-0.917	0.3595	
Positive Bias	0.242	0.264	976.695	0.917	0.3595	
YesNo	1.703	0.216	976.695	7.896	7.71E-15	***
PosNeg	2.422	0.216	976.695	11.228	< 2e-16	***
Negative Bias:YesNo	-0.625	0.374	976.695	-1.673	0.0947	
Positive Bias:YesNo	-0.750	0.374	976.695	-2.008	0.045	*
Negative Bias:PosNeg	0.828	0.374	976.695	2.217	0.0269	*
Positive Bias:PosNeg	-1.859	0.374	976.695	-4.977	7.63E-07	***
YesNo:PosNeg	-4.273	0.305	976.695	-14.010	< 2e-16	***
Negative Bias:YesNo:PosNeg	-0.258	0.528	976.695	-0.488	0.6257	
Positive Bias:YesNo:PosNeg	2.680	0.528	976.695	5.072	4.71E-07	***

Neither the positive bias effect nor the negative bias effect: no significant mean acceptability rating differences across the three different bias context types, regardless of the other factors

A significant main effect of the response particle (YesNo) and the polarity of the answer sentence + the interaction effect between the response particle variable and the polarity of the answer sentence variable: the mismatching answer patterns (i.e., the Yes-Neg and No-Pos conditions) > the matching answer patterns (i.e., the Yes-Pos and No-Neg conditions)

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SFN: statistical analysis (cont'd)



Figure 2: Mean acceptability ratings of the answer patterns for Korean NPQs with SFN along with standard error bars

- In the neutral and negative bias contexts, Yes-Neg > Yes-Pos; No-Pos > No-Neg, reflecting the behavior of the truth-based answering system
- In the positive bias context, No-Pos > No-Neg, still following the truth-based system; Yes-Neg \approx Yes-Pos, not predicted within the truth-based answering system
- The acceptability of Yes-Neg could be suppressed by the positive bias context here.

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LFN: mean acceptability ratings with standard error bars



Figure 3: Mean acceptability ratings of the answer patterns for Korean NPQs with LFN along with standard error bars

 Overall similar patterns in the neutral and positive bias contexts and some bias effects: matching answer pattern > mismatching answer pattern (i.e., Yes-Pos > No-Pos, No-Neg > Yes-Neg)

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LFN: statistical analysis

Table 4: Results of the statistical analysis concerning the variables for Korean NPQs with LFN and their answer patterns using linear mixed-effects regression (Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1)

	Estimate	Std Error	df	t-value	Pr(> t)	Signif
(Intercept)	5.750	0.187	185.446	30.830	< 2e-16	***
Negative Bias	-1.563	0.268	976.515	-5.822	7.89E-09	***
Positive Bias	0.188	0.268	976.515	0.699	0.484958	
YesNo	-2.610	0.219	976.515	-11.907	< 2e-16	***
PosNeg	-1.078	0.219	976.515	-4.920	1.02E-06	***
Negative Bias:YesNo	1.766	0.380	976.515	4.652	3.74E-06	***
Positive Bias:YesNo	-0.563	0.380	976.515	-1.482	0.138666	
Negative Bias:PosNeg	1.719	0.380	976.515	4.528	6.68E-06	***
Positive Bias:PosNeg	-1.406	0.380	976.515	-3.705	0.000223	***
YesNo:PosNeg	2.844	0.310	976.515	9.176	< 2e-16	***
Negative Bias:YesNo:PosNeg	-2.313	0.537	976.515	-4.308	1.81E-05	***
Positive Bias:YesNo:PosNeg	1.063	0.537	976.515	1.979	0.04805	*

A significant main effect of the the negative bias, but not the positive bias: the mean acceptability ratings of the four answer patterns for Korean NPQ with LFN in the negative bias context, but not the ones in the positive bias context, significantly different from those in the neutral context

A significant main effect of the response particle (YesNo) and the polarity of the answer sentence + the interaction effect between the two variables(PosNeg): different mean acceptability ratings between the Yes-Pos and Yes-Neg answer patterns on the one hand and the No-Pos and No-Neg answer patterns on the other hand

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LFN: statistical analysis (cont'd)



Figure 4: Mean acceptability ratings of the answer patterns for Korean NPQs with LFN along with standard error bars

- In the neutral and positive bias contexts, Yes-Pos > Yes-Neg; No-Neg > No-Pos, following the polarity-based answering system
- In the negative bias context No-Neg > No-Pos, still showing the behavior of the polarity-based answering system; Yes-Neg > Yes-Pos, more or less showing the behavior of the truth-based answering system
- This could be due to a rather strong effect of the negative bias context compared to the behavior of the truth-based answering system.

General discussion

- Our experiment findings: not entirely countenance the judgments and results reported in the previous literature; provide further insight into possible variations in the Korean answering system
 - Regarding the effect of negation forms: truth-based answering system for answering NPQs with SFN vs. polarity-based answering system for answering NPQs with LFN



Figure 5: Mean acceptability ratings of the answer patterns for Korean NPQs with SFN and LFN in the neutral context along with standard error bars

Wee (2019): only mismatching answer patterns for NPQs with SFN; all the four
possible answer patterns for NPQs with LFN, not in line with our experiment results

General discussion (cont'd)

- 2 Specifics about Korean NPQs with SFN: overall, follow the truth-based answering system; one exception Yes-Neg \approx Yes-Pos in the positive bias context
 - Since the positive bias naturally favors a positive answer rather than a negative one, we could expect a positive statement to be followed regardless of the response particles. This seems to have caused the positive bias context to behave differently from the neutral and negative bias contexts.
- 3 Specifics about Korean NPQs with LFN: in general, follow the polarity-based answering system; one exception Yes-Neg > Yes-Pos in the negative bias context, showing the behavior of the truth-based answering system
 - Since the negative bias is conducive to a negative answer rather than a
 positive answer, it could be attributed to the fact that the negative bias
 effect overrides the truth-based answering system.
 - Koo (2004): no bias effects; only preference for the mismatching answer pattern over the matching answer pattern, not consistent with our experiment results regarding NPQs with LFN

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General discussion (cont'd)

4 Interactions between negation forms and bias types: Contextual bias seems to play some important roles in the variations in the Korean answering system



Figure 6: Mean acceptability ratings of the answer patterns for Korean NPQs with SFN and LFN in the positive and negative bias contexts along with standard error bars

- Stronger positive bias effect for NPQs with LFN than those with SFN: Yes-Pos with LFN (mean = 5.98) > No-Pos with SFN (mean = 4.59) (p < .01)
- Stronger negative bias effect for NPQs with SFN than those with LFN: Yes-Neg with SFN (mean = 6.41) > No-Neg with LFN (mean = 4.52) (p < .001)

General discussion (cont'd)

- 5 Korean NPQs with SFN vs. those with LFN: Negation positions? Not necessarily! What seems to be more important is predicate types.
 - (12) a.
 Non-stative:
 b.
 Stative:

 Mimi an wa-ss-e?
 i
 kes an masiss-e?

 Mimi NEG come-PST-QUE
 this thing NEG delicious-QUE

 'Didn't Mimi come?'
 'Isn't this delicious?'
 - (13) a.
 Proper response to (12a):
 b.
 Proper response to (12b):

 ung, an o-ass-e.
 ung, masiss-e.

 yes, NEG come-PST-DECL
 yes, delicious-DECL

 'Yes, she didn't come.'
 'Yes, it is delicious.'
 - SFN-marked NPQs with a non-stative predicate: follow the truth-based answering system
 - SFN-marked NPQs with a stative predicate: follow the polarity-based answering system; we do not ask this kind of stative NPQs when we expect a negative statement
 - If this is what the fact is even for SFN-marked NPQs, the position of negation may not be a key factor in determining the answering system in Korean.

Conclusion

- Answering systems are complex and the simple binary distinction between languages with a polarity-based answering system and those with a truth-based answering system has been recently challenged from both theoretical and empirical perspectives.
- In this study, we investigated the effects of different negation forms and bias types in answering Korean NPQs from an experimental perspective.
- The results overall indicate that both negation forms and bias types play certain roles in the variations in the Korean answering system.
- Possible contribution: Our study can serve as a pioneer work on the variations in the Korean answering system, inviting further empirical, experimental studies regarding the effects of other grammatical factors like intonation and predicate types on the topic.

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