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Variations in answering negative polar questions in Korean: An experimental study

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Abstract

With respect to how to answer polar questions, languages are taken to employ either the polarity-based system (e.g., English) or the truth-based one (e.g., Japanese). This dichotomy, however, is challenged when speakers make use of different negation forms and contextual information, particularly when answering negative polar questions (NPQs). This study investigates how two negation forms (short-form and long-form) and contextual bias affect the way speakers answer NPQs in Korean. The acceptability judgment experiment we conducted in this study shows that contextual bias, interacting with the negation form, often overrides the two-way distinction of answering systems. The results imply that a proper description of the variations in the Korean answering system to NPQs requires tight interactions among various grammatical components, including the discourse structure, rather than a syntax-based account that resorts solely to the syntactic structures of negation forms involved.

Keywords: Polar questions; Response particles; Answering system; Polarity-based; Truth-based; Contextual bias; Negation; Pragmatic assumptions

1. INTRODUCTION

Questions and answers are pivotal in dialogue exchanges. One most frequently used pattern involves exchanges between polar questions and bare response particles, as illustrated by the following English and Japanese examples:[1]

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[1] The abbreviations used in the paper are as follows: ACC: accusative marker, CONN: connective marker, DECL: declarative marker, NEG: negative marker, NOM: nominative marker, PST: past tense marker, QUE: question marker, TOP: topic marker.

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(1) Q: Is Sam coming for dinner?
A1: Yes. (=he is coming for dinner.)
A2: No. (=he is not coming for dinner.)

(2) Q: kimi tukarete?
you tired
'Are you tired?'
A1: un.
yes
'Yes.' (=I am tired.)
A2: uun.
no
'No.' (=I am not tired.)

In these examples, positive polar questions (PPQs) here are answered by stand-alone response particles, which are interpreted as clausal propositions. Both languages behave the same in answering PPQs: the affirmative response particle is used for agreement with the positive proposition evoked by the PPQ in question and the negative response particle is used for disagreement with the proposition.

Although languages have a quite uniform way of answering PPQs, they diverge with respect to how to answer negative polar questions (NPQs) with response particles. Literature has noted that there are two main answering systems: polarity-based and truth-based answering systems (Kuno, 1973; Pope, 1976; Jones, 1999; Krifka, 2013; Holmberg, 2016; Moser, 2018). Observe the following exchanges in English and Japanese:

(3) Q: Didn't John drink coffee?
A1: Yes. (=he drank coffee.) (polarity-based, affirmation)
A2: No. (=he did not drink coffee.) (polarity-based, disaffirmation)

(4) Q: kimi tukarete nai?
you tired NEG
'Are you not tired?'
A1: un. (truth-based, agreement)
yes
'Yes.' (=I am not tired.)
A2: uun. (truth-based, disagreement)
no
'No.' (=I am tired.)

As in (3), the polarity of the response particle in English is in accordance with the polarity of the optional answer sentence given in the parentheses: the response particle and the following optional answer sentence have the same polarity value. On the other hand, the response particle in Japanese confirms or contradicts the truth of the negative proposition evoked by the NPQ. As indicated by the answer sentences in the parentheses, the affirmative response particle *un* 'yes' in (4A1) agrees with the negative proposition induced by the NPQ while the negative response particle *uun*

'no' in (4A2) disagrees with the negative proposition. In languages with the polarity-based answering system, the response particle has the same polarity value of the answer's proposition; on the other hand, in languages with the truth-based answering system, the response particle agrees or disagrees with the truth value of the negative proposition evoked by the NPQ.

This bipartite distinction for answering systems appears to be robust, but there are environments where this distinction is overridden. For instance, consider so-called negative neutralization examples illustrated in (5) (data from Kramer and Rawlins, 2011):[2]

(5) 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.)

Though the meaning of the negative response particle *no* here is what we expect from the polarity-based answering system, the meaning of the affirmative response particle *yes* in (5A1) differs. The positive response particle confirms not the positive but the negative proposition of the NPQ, which follows not the polarity-based but the truth-based answering system. The uses of the positive response particle thus override the polarity-based answering system of English. The suggested account for this behavior is to refer to the position of the negation. That is, unlike in (3Q) where the negation is in a higher position, the negation in (5Q) is taken to be within the VP, low in the syntactic structure (Holmberg, 2013, 2016).

Another factor that may affect answering systems is contextual bias. There are two types of bias: contextual and epistemic/speaker bias, and it has been noted that NPQs display these different types of bias (Ladd, 1981; Büring and Gunlogson, 2000; Romero and Han, 2004; Reese, 2007; Sudo, 2013; Goodhue, 2022). Contextual bias, characterized as publicly available evidence in the current discourse situation, favors a particular polar question and its answer, as shown in the following:

(6) Positive bias context: A is sitting in a windowless office and B enters wearing a wet raincoat.
Q1: Is it raining?
Q2: #Isn't it raining? (Reese, 2007: 89-90)

(7) Negative bias context: A is sitting in a windowless office and B enters wearing a Hawaiian shirt and sunglasses.
Q1: #Is it raining outside?
Q2: Isn't it raining outside? (Reese, 2007: 89)

The felicitous polar question with the positive situational evidence in (6) is the PPQ, not the NPQ. In contrast, the appropriate polar question with the negative situational evidence in (7) is the NPQ, not the PPQ. Due to the particular contextual bias involved here, the most natural answer to Q1 in (6) is *Yes, it is* while the one to Q2 in (7) is *No, it isn't*.

Unlike contextual bias, epistemic bias is characterized as the speaker's private belief or expectation and an NPQ can convey different flavors of epistemic bias, as demonstrated below:

(8) Positively biased NPQ:
A: You guys must be starving. You want to go get something to eat?
B: Yeah, isn't there a vegetarian restaurant around here? Moosewood or something like that? (Ladd, 1981: 164)

[2] There seem to be different preferences between A1 and A2 in confirming the negative proposition that Alfonso is not coming to the party. Based on experiment results Goodhue and Wagner (2018) and Repp et al. (2019) also cast doubt on Kramer and Rawlins's notion of negative neutralization. For instance, such experimental studies show that examples like (5A1) are less acceptable than the other response patterns involving *yes* and *no* in English. They also show that neutralization in English is more acceptable in positive answers to negative statements or questions than in negative answers (e.g., Q: *Is Alfonso not coming to the party?* A1: *Yes, he is coming to the party.* A2: *No, he is coming to the party.*). See Goodhue and Wagner (2018) and Repp et al. (2019) for a detailed discussion as well as judgement experiments in this regard.

(9) Negatively biased NPQ:
A: I'd like to take you guys out to dinner while I'm here.
B: But there's not really any place to go in Hyde Park.
A: Oh, really, isn't there a vegetarian restaurant around here? (Ladd, 1981: 164)

The NPQ in (8) uttered by speaker B suggests that she believes that there is probably a vegetarian restaurant around and asks whether or not her belief is correct. By contrast, the identical NPQ in (9) produced by speaker A implies that contrary to her initial expectation, she now thinks from what speaker B says that there might not be a vegetarian restaurant around and asks for a confirmation of this new negative supposition. The former is called 'a positive bias NPQ (or NPQ with an outer negation reading)' as the speaker has a bias toward the positive answer while the latter is called 'a negative bias NPQ (or NPQ with an inner negation reading)' as the speaker has a bias toward the negative answer.[3]

There have been several attempts to account for answering systems across languages from both theoretical and experimental perspectives. Most previous studies have focused on identifying the grammatical factors that play roles in determining the answering systems (Kramer and Rawlins, 2011; Holmberg, 2013, 2016; Krifka, 2013; Meijer et al., 2015; Roelofsen and Farkas, 2015; Claus et al., 2017; Kim, 2017). Recent experimental studies have also investigated a variety of response strategies used by speakers of different languages, such as English, German, and Romanian, and tested theoretical predictions (e.g., Farkas and Bruce, 2010; Farkas, 2011; Brasoveanu et al., 2013; Krifka, 2013; Meijer et al., 2015; Roelofsen and Farkas, 2015; Claus et al., 2017). In addition, other recent experimental studies have examined the role of intonation in the production, interpretation, and preference patterns of response particles like *yes* and *no* in diverse languages such as Catalan, Russian, and Mandarin Chinese (e.g., González-Fuente et al., 2015; Tubau et al., 2015; Li et al., 2016; Goodhue and Wagner, 2018). The findings of these previous studies show that there are no languages with a purely polarity-based or truth-based answering system. Instead, they suggest that languages can employ both polarity-based and truth-based answering strategies depending on grammatical and contextual information.

Our empirical investigation in this study follows this direction. We attempt to investigate variations in the uses of response particles in Korean and to understand how grammatical and contextual information affects its answering system. In Section 2, we first review grammatical properties that play crucial roles in the Korean answering system and discuss related variables involving negation forms and contextual bias types that could influence the ways speakers interpret and respond to Korean NPQs (e.g., Chang, 1975; Kim, 2024; Koo, 2001, 2004; Wee, 2019; Yang, 1991). In Section 3, we provide a description of the predictions that can be made based on the observations noted in previous literature as well as research questions in a clear way. In Section 4, we then report the results of our acceptability judgment task that we performed to test the interactive roles of these variables. This section also dicusses how the types of negation and contextual bias affect preferred answering patterns for Korean NPQs. In Section 5, we review the findings from the acceptability judgment task and then discuss their implications. In doing so, we argue that our experiment results are best accounted for by allowing tight interactions with the discourse structure evoked in the context. The conclusion in Section 6 summarizes the findings of our study and offers suggestions for future research.

2. ISSUES RELATED TO THE KOREAN ANSWERING SYSTEM

Unlike English, Korean adopts verbal endings to express polar questions (PQs):

(10) a. Mimi-ka khephi-lul masy-ess-ta.
Mimi-NOM coffee-ACC drink-PST-DECL
'Mimi drank coffee.'
b. Mimi-ka khephi-lul masy-ess-ni?
Mimi-NOM coffee-ACC drink-PST-QUE
'Did Mimi drink coffee?'

As illustrated here, Korean does not involve subject-auxiliary inversion for the formation of PQs. In answering PQs, Korean, just like Indo-European languages and other natural languages, employs simple response particles. It uses simple

[3] For a recent discussion casting doubt on the claim that NPQs with high negation have an inner negation reading, see Goodhue (2022: 390-392).

response particles *ung* 'yes' and *ani* 'no', yielding propositional meanings, as shown in the following responses to the PQ in (10b):

(11) A1: ung.
yes.
'Yes.' (=she drank coffee.)
A2: ani.
no
'No.' (=she did not drink coffee.)

However, complications emerge related to the negation in Korean. Korean has two forms of negation: short-form negation (SFN) and long-form negation (LFN), as in (12):

(12)	a.	Mimi-ka	khephi-lul	an	masy-ess-ta.	(SFN)
		Mimi-NOM	coffee-ACC	NEG	drink-PST-DECL	
		'Mimi did not drink coffee.'				
	b.	Mimi-ka	khephi-lul	masi-ci	anh-ass-ta.	(LFN)
		Mimi-NOM	coffee-ACC	drink-CONN	NEG-PST-DECL	
		'Mimi did not drink coffee.'				

The SFN construction, as in (12a), has the negation marker *an* directly attached (or adjoined) to the immediately following main verb whereas the LFN construction, as in (12b), involves the combination of a *ci*-marked main verb with the negative auxiliary verb *anh-* (Kim, 2000, 2016; Hagstrom, 2000, 2002; Sells, 2001; Sells and Kim, 2006; Han et al., 2007).[4] These two forms are used interchangeably in many contexts, but the former is preferred in spoken registers while the latter is favored in written ones (Lee, 1970; Oh, 1971; Choi, 1985).

Notably, previous literature has also shown that SFN and LFN have distinctive syntactic positions with LFN being higher than SFN (e.g., Hagstrom, 2002; Kim, 2002; Han et al., 2007). For instance, Han et al. (2007) argue that SFN is a specifier or an adjunct within VP while LFN is the head of NegP, which takes a VP as its complement. One piece of evidence for different syntactic positions of the two negation forms in Korean can be seen in (13) (data slightly modified from Han et al., 2007; 15, (36)):[5]

(13)	Toli-ka	maykcwu-lul	an	masi-ci	anh-ass-ta.
	Toli-NOM	beer-ACC	NEG	drink-CONN	NEG-PST-DECL
	'Toli didn't not drink beer.'				
	(=It is not the case that Toli did not drink beer. / Toli drank beer.)				

This example contains both SFN and LFN and the latter scopes over the former, indicating that LFN is in a higher syntactic position than SFN.

According to the binary distinction between polarity-based and truth-based answering system languages, Korean has been traditionally classified as a language with a truth-based answering system, similar to Thai, Mandarin Chinese, and Japanese (Jones, 1999; Holmberg, 2016; Moser, 2018; Park, 2023). To illustrate, consider a Korean NPQ and its legitimate answers in (14), corresponding to the English ones in (3) above:

[4] Literature often takes the SFN marker *an* as an adverb, but it could also be treated as a prefix. This consideration arises from the fact that *an* can only occur in the preverbal position and there can be no intervening element between it and the following main verb (Kim, 2016: 175-179).

[5] See Hagstrom (2002), Kim (2002), Han et al. (2007), and Kim (2024) for additional supporting evidence for the distinctive syntactic positions of SFN and LFN in Korean (e.g., scope-relations with focus expressions and quantifiers).

(14)	Q:	John-i	khephi-lul	an	masy-ess-ni?	
		John-NOM	coffee-ACC	NEG	drink-PST-QUE	
		'Didn't John drink coffee?'				
	A1:	ung.			(truth-based, agreement)	
		yes				
		'Yes.'	(=he did not drink coffee.)			
	A2:	ani.			(truth-based, disagreement)	
		no				
		'No.'	(=he drank coffee.)			

Here, the answers to a Korean NPQ follow the truth-based answering system because the response particle agrees or disagrees with the truth value of the negative proposition evoked by the NPQ as in the Japanese case in (4). Note then that in the Korean NPQ in (14Q), SFN is used. Thus, one may assume that if we adopt Holmberg's syntactic analysis, the answer patterns in (14A1) and (14A2) are expected, since SFN is in a low negation position in the syntactic structure. Holmberg's syntax-based analysis predicts that the answer patterns would differ for a Korean NPQ with LFN, under the assumption that LFN is in a higher position than SFN in the language. However, some previous literature has provided examples like (15), where the answer patterns for a Korean NPQ with LFN still follow the truth-based answering system (Park, 2015; Kim, 2017, 2024).

(15)	Q:	Mimi	o-ci	anh-ass-ni?
		Mimi	come-CONN	NEG-PST-QUE
		'Didn't Mimi come?'		
	A1:	ung.		
		yes		
		'Yes.'	(=she did not come.)	
	A2:	ani.		
		no		
		'No.'	(=she came.)	

Examples as in (14) and (15) suggest that Korean employs a truth-based answering system, regardless of the negation form used in NPQs. This then implies that a Holmberg-style syntactic analysis, positing different positions for SFN and LFN, does not apply to Korean in accounting for its answering system if the two negation forms are indeed in different syntactic positions.

Things become more complicated when we consider a whole paradigm noted in some previous literature. For example, Wee (2019: 580) provides the following judgments for the four possible answers to a Korean NPQ with SFN:

(16)	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 in (16A1) and (16A2), following a truth-based answering system, are judged as natural. On the other hand, the ones in (16B1) and (16B2), which follow a polarity-based answering system, are judged as unnatural.

However, it has been noted that NPQs with LFN could follow not only the truth-based but also the polarity-based answering systems, as shown below (data from Wee, 2019: 580):

(17)	Q:	Lina-ka	khwukhi-lul	mek-ci	anh-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.)'				

According to the truth-based answering system, only (17A1) and (17A2) would be felicitous responses to the NPQ. However, as noted by Chang (1975: 181), Yang (1991: 119), and Wee (2019), (17B1) and (17B2) are also judged as possible, although these two follow the polarity-based answering system.

If the judgments for the answer patterns for SFN- and LFN-marked Korean NPQs in (16) and (17) are right, they are not accounted for by a Holmberg-style syntactic analysis resorting to different syntactic positions of negation. In particular, the flexibility of answer patterns for LFN-marked Korean NPQs as in (17) poses problems for such a syntax-based analysis. Wee (2019), adopting the analysis of Krifka (2013), then suggests that the Korean response particles *ung* 'yes' *and ani* 'no' are anaphors, referring back to the antecedent proposition that they respond to, and that Korean NPQs always allow for only one antecedent proposition regardless of the negation form used, as in (16Q) and (17Q). She argues that the response particles for a Korean NPQ with SFN can have only one discourse referent and it is the outer NegP introduced by the NPQ with SFN, but not any other inner propositions like TP. This explains why only the answers following the truth-based answering system are acceptable, as in (16). As for a Korean NPQ with LFN, she maintains that ambiguity arises due to two possible interpretations: a pragmatic interpretation and a literal interpretation. The former is positively biased while the latter is not biased and simply truth-conditional (Ladd, 1981; Romero and Han, 2004; Krifka, 2013, 2017; Park and Dubinsky, 2019). This ambiguity thus allows for all four possible answer patterns for a Korean NPQ with LFN, as in (17).

As hinted above from Wee's (2019) analysis, SFN- and LFN-marked NPQs in Korean may have different pragmatic functions regarding their uses, yet no consensus has been reached in previous literature about them.[6] For instance, Chang (1986) notes that the two types of NPQs in Korean are not pragmatically different. In addition to an information-seeking use both can also be used when the questioner has a positive or negative assumption about the proposition evoked by the question under discussion. Consider the two NPQ examples in (18):

[6] A reviewer questions about the possibility of the two negation forms having different (biased) meanings in their polar questions and whether the answering system might be solely affected by the biased meaning. However, as described here, it is still controversial, and no consensus has been made yet.

(18) a. Mimi-nun an ka-ni? (SFN)
Mimi-TOP NEG go-QUE
'Doesn't Mimi go?'

b. Mimi-nun ka-ci anh-ni? (LFN)
Mimi-TOP go-CONN NEG-QUE
'Doesn't Mimi go?'

Chang (1986: 30-31) states that the two types of Korean NPQs can be used to ask the addresses to seek information about whether Mimi goes or not with no particular assumption about it. However, he adds that they can also be used either when the questioner believes that Mimi goes or when she believes that Mimi does not, to confirm her own assumption from the addressee. In other words, according to Chang (1986), SFN- and LFN-marked NPQs in Korean have three different meanings in the same way; however, he attributes their presuppositional differences to suprasegmental features like pauses and accent/intonation patterns.

Some other previous studies discuss the functional properties of Korean NPQs with LFN, ignoring those of NPQs with SFN. For example, Kim (1981), Chang (1984), and Koo (1992) argue that a Korean NPQ with LFN can be used as a true information-seeking question with no particular assumption from the questioner about the proposition induced by the question; however, it can also be used as a confirmation question to express her positive assumption rather than the negative one about the proposition conveyed by the question and to seek confirmation from the addressee. Thus, the NPQ with LFN in (18b), on the one hand, can be used when the questioner does not have any particular assumption about whether Mimi goes or not and wants to seek information about it; on the other hand, it can also be used when the questioner has a positively biased assumption about Mimi's going and wants to check from the addressee whether her assumption is correct. In a similar manner, Park and Dubinsky (2019) and Wee (2019) briefly mention that Korean NPQs tend to be used more preferably when the questioner has a positive assumption than a negative assumption about the proposition expressed by the question.

There has been little discussion about the effect of contextual bias on the possible answer patterns for Korean NPQs. One exception is Koo (2001), which conducted a small-scale questionnaire-based survey. Consider the following NPQ-answer responses (data from Koo, 2001: 413-414):

(19) Q: ne Chelswu an manna-ss-nya?
you Chelswu NEG meet-PST-QUE
'Didn't you meet Chelswu?'

A1: ung, an manna-ss-e.
yes NEG meet-PST-DECL
'Yes, I didn't meet him'

A2: ani, manna-ss-e.
no meet-PST-DECL
'I met him.'

B1: ung, manna-ss-e.
yes meet-PST-DECL
'Yes, I met him.'

B2: ani, an manna-ss-e.
no NEG meet-PST-DECL
'No, I didn't meet him.'

According to Koo (2001), the answers in (19A1) and (19A2) are used in a neutral context with no particular contextual bias, which is expected within the truth-based answering system. Koo (2001) then notes that those in (19B1) and (19B2), following the polarity-based answering system, are also possible in a positive bias context where the questioner believes that the responder met Chelswu. The questionnaire-based survey had six dialogue exchanges, each one with eight questions for comprehension and selection for a more proper response. The reported results suggest that bias types do not critically influence the preferred answer patterns for Korean NPQs. In a neutral context with no particular bias, almost all of the 49 subjects (93.9%) adopted the truth-based answering system. Even in a positive bias context,

the majority of the subjects (about 90%) followed the truth-based answering system while only about 10% of the subjects selected (19B1) and (19B2) patterns, as expected from the polarity-based answering system.

On the other hand, Kim (2024) shows that Korean NPQs can evoke either a positive or negative proposition depending on the given context or the contextual bias and the response particles *ung* 'yes' and *ani* 'no' are anaphoric to the salient proposition. Observe the examples below:

(20) Negatively biased: The speaker knows that the hearer swims early morning everyday but saw him in the morning.

Q:	achim-ey	swuyeng	ka-ci	anh-ass-ni?
	morning-in	swimming	go-CONN	NEG-PST-QUE
	'Didn't you go swimming in the morning?'			
A1:	ung,	(an	ka-ss-e.)	
	yes	NEG	go-PST-DECL	
	'Yes, (I didn't go swimming.)'			
A2:	ani,	(ka-ss-ta	wa-ss-e.)	
	no	go-PST-CONN	come-PST-DECL	
	'No, (I went swimming and came back.)'			

(21) Positively biased: Watching a runner winning the race with a record.

Q:	ce	senswu	ppalu-ci	anh-ni?
	that	runner	fast-CONN	NEG-QUE
	'Isn't that runner fast?'			
A1:	ung,	(ppalu-ney.)		
	yes	fast-DECL		
	'Yes, (he/she is fast.)'			
A2:	ani,	(kulehkey	ppalu-ci-nun	anh-ney.)
	no	so	fast-CONN-TOP	NEG-DECL
	'No, (he/she isn't that fast.)'			

(22) Unbiased: The speaker over the phone asks the hearer if the pandemic situation there is dangerous.

Q:	ku	kos	wihemha-ci	anh-ni?
	that	place	dangerous-CONN	NEG-QUE
	'Isn't your place dangerous?'			
A1:	ung,	(wihemha-ci	anh-a.)	
	yes	dangerous-CONN	NEG-DECL	
	'Yes, (it isn't dangerous.)'			
A2:	ung,	(wihemha-y.)		
	yes	dangerous-DECL		
	'Yes, (it is dangerous.)'			

According to Kim (2024), when a negative contextual bias is provided, the answers to a Korean NPQ naturally follow the expected truth-based answering system as in (20). On the other hand, when a positive contextual bias is salient, the proper answers follow the unexpected polarity-based answering system as in (21). In the meantime, when no particular bias is given in the context, the answers following either the truth-based or polarity-based answering system can be felicitous depending on the responder's belief about the situation described by the NPQ as in (22). He then claims that Korean exhibits a mixed answering system in this respect and it can be best accounted for within a discourse-based framework making use of the enriched, structured discourse with QUD (question-under-discussion) and SAL-UTT (salient-utterance).

As reviewed so far, there have been some studies on Korean NPQs and their answer patterns. However, they have not systematically discussed interactive roles of the two negation forms (SFN and LFN) and contextual bias types (neu-

tral, positive, and negative) in the variations of answer patterns and they even have made different observations about acceptable/preferred answers to Korean NPQs.

3. RESEARCH QUESTIONS AND PREDICTIONS

As discussed above, previous studies on the answering patterns for Korean NPQs have made different judgments and observations about their uses and possible/preferred answer patterns for them. In discussing grammatical properties of Korean NPQs, they have focused on negation forms (i.e., SFN and LFN) and bias types (neutral, positive, and negative). However, most of them have discussed only one type of NPQs, in particular, LFN-marked NPQs, neglecting properties of SFN-marked ones, and there is very little literature on the effect of bias on Korean NPQs and their answer patterns. To overcome these shortcomings, we aim to investigate the issue of possible variations of the Korean answering system with respect to the two factors, negation forms and bias types, in a systematic way. The following are then the research questions of our paper:

1. *Do the two distinct forms of negation (i.e., SFN and LFN) influence the answering system of Korean?*
2. *Does contextual bias affect the answering system of Korean?*
3. *Is there an interaction between the forms of negation and contextual biases in shaping the answering system of Korean?*

In investigating these three questions, we aim to discern whether syntax or pragmatic assumptions play a key role in the variations of its answering system.[7] We also try to establish whether different bias conditions alter the response patterns for SFN- and LFN-marekd NPQs. For the final question, we examine whether the combined effects of negation type and bias context lead to distinctive answering patterns within this language framework.

The predictions based on the observations and judgments made in previous literature can be summarized as following:

First, If syntax is the sole factor determining the answering system of Korean, as suggested by Holmberg (2013, 2016), and if SFN is in a low position while LFN is in a high position in the structure, as shown by previous literature (e.g., Hagstrom, 2002; Kim, 2002; Han et al., 2007), then the answer patterns for SFN-marked NPQs would follow the truth-based answering system while those for LFN-marked NPQs would follow the polarity-based answering system, across different bias types.

Second, if pragmatic assumptions take precedence over syntactic positions of negation markers in determining the answer patterns for Korean NPQs, consistency in assumptions in both SFN- and LFN-marked NPQs, as suggested by Chang (1986), should yield the same answer patterns in neutral, unbiased contexts. On the other hand, If LFN-marked NPQs are more strongly associated with a positive assumption unlike SFN-marked NPQs, as claimed or hinted by Kim (1981), Chang (1984), Koo (1992), Park and Dubinsky (2019), and Wee (2019), the answer patterns for LFN-marked NPQs would follow the polarity-based answering system in neutral, unbiased contexts.

Third, if contextual bias is found to be irrelevant to the answering system as demonstrated by Koo (2001), then both positively- and negatively-biased contexts should not alter the answer patterns for SFN- and LFN-marked NPQs compared to neutral, unbiased contexts. However, if bias does influence the answering system, as argued by Kim (2024), negatively-biased contexts would favor a truth-based answering system whereas positively-biased contexts would prefer a polarity-based system, both for SFN- and LFN-marked NPQs.

Fourth, if the assumptions for SFN- and LFN-marked NPQs differ and if these interact with bias types, it is possible to ascertain which factor exerts a more substantial influence on the variations of the Korean answering system. Given the lack of existing literature on the interactive effects of negation forms and bias types, we refrain from making specific predictions about them at this point.

To explore these issues regarding the possible variations of the Korean answering system with respect to NPQs and their answer patterns, we designed an acceptability judgment task. The findings from this experiment are presented and discussed in the following section.

[7] As discussed above in Section 2, the term “pragmatic assumption” here is related to the assumption or presupposition that a questioner has about the proposition evoked by the question. One may consider it to be epistemic bias (Kim, 1981; Ladd, 1981; Chang, 1984; Chang, 1986; Koo, 1992; Park and Dubinsky, 2019; Wee, 2019). However, previous literature on Korean NPQs is not entirely clear whether the pragmatic assumption/presupposition is solely that of the questioner or it also includes assumptions shared by the speaker and the addressee based on the given situation or context.

4. EXPERIMENT

4.1. Methodology

4.1.1. Participants

We recruited thirty-two native speakers of Korean to participate in our acceptability judgment task. They were all university students (14 male and 18 female, mean age: 25.6) with no prior experience of staying abroad for more than 6 months. After completing the task, each participant received a minimum amount of monetary compensation.

4.1.2. Materials and design

The experimental materials were all constructed in Korean with four variables: three types of bias contexts (neutral, positive, and negative bias), two negation forms in Korean NPQs (SFN and LFN), two response particles (*ung* 'yes' and *ani* 'no'), and two polarity values (positive and negative) of the answer sentence that could optionally follow a response particle. The positive and negative biases were contextual rather than epistemic, and the neutral contexts were unbiased, serving as controls. Since it is hard to construct NPQs with both positive and negative bias contexts at the same time, we created 16 sentences, each of which was constructed in a positive bias context and in a neutral context (Type 1), and 16 sentences, each of which was constructed in a negative bias context and in a neutral context (Type 2), respectively.

The following exchanges are illustrative Korean NPQ and answer pair examples with the three types of contextual bias we used in the experiment.

(23) Neutral: Meeting a friend in the evening.

Q:	cenyek	an	mek-ess-ni?	(SFN)
	dinner	NEG	eat-PST-QUE	
	'Didn't you eat dinner?'			
A1:	ung,	mek-ess-e.		
	yes	eat-PST-DECL		
	'Yes, I ate dinner.'			
A2:	ung,	an	mek-ess-e.	
	yes	NEG	eat-PST-DECL	
	'Yes, I didn't eat dinner.'			
A3:	ani,	mek-ess-e.		
	no,	eat-PST-DECL		
	'No, I ate dinner.'			
A4:	ani,	an	mek-ess-e.	
	no	NEG	eat-PST-DECL	
	'No, I didn't eat dinner.'			

(24) Positive bias: Seeing a friend eating hot-steaming ramen and asking if it is hot or not.

Q:	lamyen	an	ttukep-ni?	(SFN)
	ramen	NEG	hot-QUE	
	'Isn't the ramen hot?'			
A1:	ung,	ttuke-we.		
	yes	hot-DECL		
	'Yes, it is hot.'			
A2:	ung,	an	ttuke-we.	
	yes	NEG	hot-DECL	
	'Yes, it isn't hot.'			
A3:	ani,	ttuke-we.		
	no,	hot-DECL		
	'No, it is hot.'			

A4:	ani,	an	ttuke-we.
	no,	NEG	hot-DECL
	'No, it isn't hot.'		

(25) Negative bias: Seeing a dirty lab and asking if one cleaned the lab or not.

Q:	ecey	chengso	an	ha-yss-ni?	(SFN)
	yesterday	clean	NEG	do-PST-QUE	
	'Didn't you clean the lab yesterday?'				
A1:	ung,	ha-yss-e.			
	yes	do-PST-DECL			
	'Yes, I cleaned the lab.'				
A2:	ung,	an	ha-yss-e.		
	yes	NEG	do-PST-DECL		
	'Yes, I didn't clean the lab.'				
A3:	ani,	ha-yss-e.			
	no,	do-PST-DECL			
	'No, I cleaned the lab.'				
A4:	ani,	an	ha-yss-e.		
	no,	NEG	do-PST-DECL		
	'No, I didn't clean the lab.'				

(26) Neutral: Meeting a friend in the evening.

Q:	cenyek	mek-ci	anh-ass-ni?	(LFN)
	dinner	eat-CONN	NEG-PST-QUE	
	'Didn't you eat dinner?'			
A1:	ung,	mek-ess-e.		
	yes	eat-PST-DECL		
	'Yes, I ate dinner.'			
A2:	ung,	mek-ci	anh-ass-e.	
	yes	eat-CONN	NEG-PST-DECL	
	'Yes, I didn't eat dinner.'			
A3:	ani,	mek-ess-e.		
	no,	eat-PST-DECL		
	'No, I ate dinner.'			
A4:	ani,	mek-ci	anh-ass-e.	
	no	eat-CONN	NEG-PST-DECL	
	'No, I didn't eat dinner.'			

(27) Positive bias: Seeing a friend eating hot-steaming ramen and asking if it is hot or not.

Q:	lamyen	ttukep-ci	anh-ni?	(LFN)
	ramen	hot-CONN	NEG-QUE	
	'Isn't the ramen hot?'			
A1:	ung,	ttuke-we.		
	yes	hot-DECL		
	'Yes, it is hot.'			

A2:	ung,	ttukep-ci	anh-a.
	yes	hot-CONN	NEG-DECL
	'Yes, it isn't hot.'		
A3:	ani,	ttuke-we.	
	no,	hot-DECL	
	'No, it is hot.'		
A4:	ani,	ttukep-ci	anh-a.
	no,	hot-CONN	NEG-DECL
	'No, it isn't hot.'		

(28) Negative bias: Seeing a dirty lab and asking if one cleaned the lab or not.

Q.	ecey	chengsoha-ci	anh-ass-ni?	(LFN)
	yesterday	clean-CONN	NEG-PST-QUE	
	'Didn't you clean the lab yesterday?'			
A1:	ung,	ha-yss-e.		
	yes	do-PST-DECL		
	'Yes, I cleaned the lab.'			
A2:	ung,	ha-ci	anh-ass-e.	
	yes	do-CONN	NEG-PST-DECL	
	'Yes, I didn't clean the lab.'			
A3:	ani,	ha-yss-e.		
	no,	do-PST-DECL		
	'No, I cleaned the lab.'			
A4:	ani,	ha-ci	anh-ass-e.	
	no,	do-CONN	NEG-PST-DECL	
	'No, I didn't clean the lab.'			

As noted here, there are four possible responses with the two response particles *ung* 'yes' and *ani* 'no', each of which is followed by either a positive (Pos) or a negative (Neg) statement. In the present study, these four different answer patterns are identified as Yes-Pos, Yes-Neg, No-Pos, and No-Neg, respectively.[8]

For the variable of negation forms, all NPQs were created with the two negation forms, SFN ('*an* V') and LFN ('V-*ci anh-ta*'). Each question was paired with four different answer patterns (i.e., Yes-Pos, Yes-Neg, No-Pos, and No-Neg). This system then resulted in each NPQ being paired with a total of eight responses, as illustrated in Tables 1 and 2 below:

Together with this process, we constructed 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) and distributed them to eight experimental lists using a Latin-square design. Each list thus included 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. In addition to the target NPQ-answer pairs, the experiment also included 128 question–answer pairs (64 appropriate and 64 inappropriate pairs) per experimental list as filler items. We divided these 192 experimental items (64 target and 128 filler items) of one list into two sets and assigned these two sets to each participant in a randomized order.

4.1.3. Procedure

The task was conducted online using the MOA form (https://ko.moaform.com), a Korean free online survey platform. Each participant was exposed to one of the eight experimental lists and the materials were pseudo-randomly presented, avoiding the repetition of the same types of experimental items in a row. Participants were instructed to judge the

[8] There is a possibility that the responders, assuming that the provided context is rather underspecified, could add the necessary context to interpret the NPQs given here. However, all the experiment sentences were cross-checked with 10 native speakers to ensure that they were felicitous with the specified context.

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

Cond.	Form	NPQ	Answer		
			RP	Statement	Meaning
1	SFN	lamyen an ttukep-ni?	ung,	ttuke-we.	Yes, it is hot.
2		ramen NEG hot-QUE	ung,	an ttuke-we.	Yes, it isn't hot.
3		'Isn't the ramen hot?'	ani,	ttuke-we.	No, it is hot.
4			ani,	an ttuke-we.	No, it isn't hot.
5	LFN	lamyen ttukep-ci anh-ni?	ung,	ttuke-we.	Yes, it is hot.
6		ramen hot-CONN NEG-QUE	ung,	ttukep-ci anh-a.	Yes, it isn't hot.
7		'Isn't the ramen hot?'	ani,	ttuke-we.	No, it is hot.
8			ani,	ttukep-ci anh-a.	No, it isn't hot.

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

Cond.	Form	NPQ	Answer		
			RP	Statement	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		'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	LFN	ecey chengsoha-ci anh-ass-ni?	ung,	ha-yss-e.	Yes, I cleaned the lab.
6		yesterday clean-CONN NEG-PST-QUE	ung,	ha-ci anh-ass-e.	Yes, I didn't clean the lab.
7		'Didn't you clean the lab yesterday?'	ani,	ha-yss-e.	No, I cleaned the lab.
8			ani,	ha-ci anh-ass-e.	No, I didn't clean the lab.

acceptability of the answer (B's utterance) following A's NPQ on a scale from 1 to 7 for each specific bias context provided. The materials were presented sequentially, one question at a time, and participants were prevented from going back to previous questions. A short break was provided between the two experimental sets. We recorded the start time and the end time of the task for each participant and ensured that they completed the evaluation for all questions in one session.

4.1.4. Analysis

To analyze the mean acceptability ratings, we employed a mixed-effects model in R (R Core Team, 2019), using the *lme4* package (Bates et al., 2019) and *lmerTest* (Kuznetsova et al., 2019). Prior to analysis, data points more than ±2.5 standard deviations from the mean of each participant were replaced with the maximum or minimum value within 2.5 standard deviations. The model incorporated random slopes and intercepts for participants and items. We re-coded the Yes-Pos and No-Neg patterns as the polarity-match condition, and the Yes-Neg and No-Pos patterns as the polarity-mismatch condition, considering the expected effects of the polarity-based and truth-based answering systems for NPQs. The acceptability rating served as the dependent variable in the analyses.

The model equation used for the statistical analysis is as follows: lmer (Acceptability rating score $\sim$ Negation form (Short or Long) + Context 1 (Neutral or Positive) + Context 2 (Neutral or Negative) + Matchiness (Match or Mismatch) + Negation form * Context 1 * Matchiness + Negation form * Context 2 * Matchiness + (1 + Matchiness | Participant) + (1 + Matchiness | Item)). One key thing to note is that the results obtained from the LMER analysis indicated simple main effects rather than factorial ones. In order to fully understand all the relevant simple main effects, we conducted separate statistical analyses using different reference points. These reference points included SFN, Neutral, Match (Appendix (a)), SFN, Neutral, Mismatch (Appendix(b)), LFN, Neutral, Match (Appendix(c)), and LFN, Neutral, Mismatch (Appendix(d)).[9] For instance, to examine the effect of Context (i.e., contextual bias) and Mismatch (i.e., polarity mismatch)

[9] One primary objective of this study was to investigate the effects of positive and negative bias contexts in relation to the neutral context. As a result, the neutral context condition consistently served as the reference for examining the context effect.

on the acceptability ratings of the answer patterns for SFN-marked NPQs, we performed LMER with SFN, Neutral, and Match as the reference. We followed similar approaches for the remaining factors, resulting in a total of four different reference points used in the LMER analyses.

4.2. Results[10]

Fig. 1 shows the mean acceptability ratings of the answer patterns for Korean SFN- and LFN-marked NPQs in the three different bias types:

As depicted in Fig. 1, the mean acceptability ratings of the answer patterns for SFN-marked NPQs were quite different from those for LFN-marked NPQs. Specifically, the mean acceptability ratings of the answer patterns for SFN-marked NPQs were similar across the three bias contexts, although the mean acceptability rating of the Yes-Neg answer pattern was relatively lower in the positive bias context than in the neutral and negative bias contexts. Regarding the mean acceptability ratings of the answer patterns for LFN-marked NPQs, the mean acceptability rating of the Yes-Pos answer pattern was comparatively lower in the negative bias context than in the neutral and positive bias contexts. In addition, the mean acceptability rating of the Yes-Neg answer pattern was rather lower in the positive bias context than in the neutral and negative bias contexts. These results suggest that the different negation forms and bias types affect the acceptability of the answer patterns for Korean NPQs.

Next, Fig. 2, given with standard error bars, represents the mean acceptability ratings of the answer patterns for Korean NPQs with SFN and LFN in the neutral context.

As shown in Fig. 2, in the neutral context, the polarity-match and polarity-mismatch answer patterns were not equally acceptable for NPQs with SFN and those with LFN. In the neutral context for SFN-marked NPQs, the polarity mismatch effect was statistically significant, indicating that the acceptability rating of the polarity-mismatch answer patterns was higher than that of the polarity-match ones (Estimate = 2.137, Std. Error = 0.219, *t*-value = 9.777, $p < 0.001$). However, the acceptability rating of the polarity-mismatch answer patterns in the neutral context for LFN-marked NPQs showed the opposite tendency compared to SFN-marked NPQs, with a significant negative effect (Estimate = −1.422, Std. Error = 0.219, *t*-value = −6.506, $p < 0.001$). In addition, the acceptability rating of the polarity-match answer patterns was significantly higher for LFN-marked NPQs than for SFN-marked NPQs (Estimate = 2.004, Std. Error = 0.157, *t*-value = 12.770, $p < 0.001$), while the acceptability rating of the polarity-mismatch answer patterns was significantly lower for LFN-marked NPQs than for SFN-marked NPQs (Estimate = −1.555, Std. Error = 0.157, *t*-value = −9.907, $p < 0.001$). Moreover, the interaction effect between LFN and the polarity mismatch was statistically significant (Estimate = −3.559, Std. Error = 0.222, *t*-value = −16.036, $p < 0.001$). These findings suggest that in Korean the truth-based answering system (i.e., Yes-Neg and No-Pos answer patterns) is more favorably used for answering SFN-marked NPQs while the polarity-based answering system (i.e., Yes-Pos and No-Neg answer patterns) is more preferably adopted for answering LFN-marked NPQs. Thus, we can conclude that when there is no particular contextual bias, both the truth-based and polarity-based answering system strategies are employed in answering Korean NPQs and the negation forms play a major role here.

Furthermore, the contextual bias effect on the acceptability rating of the polarity-mismatch answer patterns was examined for SFN-marked NPQs. Consider Fig. 3 below:

As can be seen here, the mean acceptability ratings showed similar behavior across the three different bias contexts. That is, in the three contexts, the mean acceptability rating of the polarity-mismatch answer pattern was higher than that of its polarity-match answer pattern counterpart (i.e., Yes-Neg > Yes-Pos and No-Pos > No-Neg). This means that the truth-based answering system strategy was preferably employed in answering Korean NPQs with SFN regardless of bias types. Therefore, this indicates that the negation form plays a more important role than bias in answering SFN-marked NPQs in Korean.

To be more specific, first, the negative bias context did not significantly influence the acceptability ratings for both the polarity-match (Estimate = −0.270, Std. Error = 0.192, *t*-value = −1.402, $p = 0.161$) and polarity-mismatch answer patterns (Estimate = −0.141, Std. Error = 0.192, *t*-value = −0.732, $p = 0.464$). However, it is important to note that the Yes-Neg condition had a higher acceptability rating in the negative bias context (i.e., 6.41 in the negative bias context > 5.82 in the neutral context) while the No-Pos condition had a higher acceptability rating in the neutral context (5.10 in the neutral context > 4.23 in the negative bias context). This suggests that the negative bias had a certain effect; it improved the acceptability rating of the Yes-Neg condition and lowered the acceptability rating of the No-Pos condition. However, the negative bias effect was not strong enough to change its truth-based answering system with No. This explains why

[10] The detailed statistical analysis results are found in the Appendix.

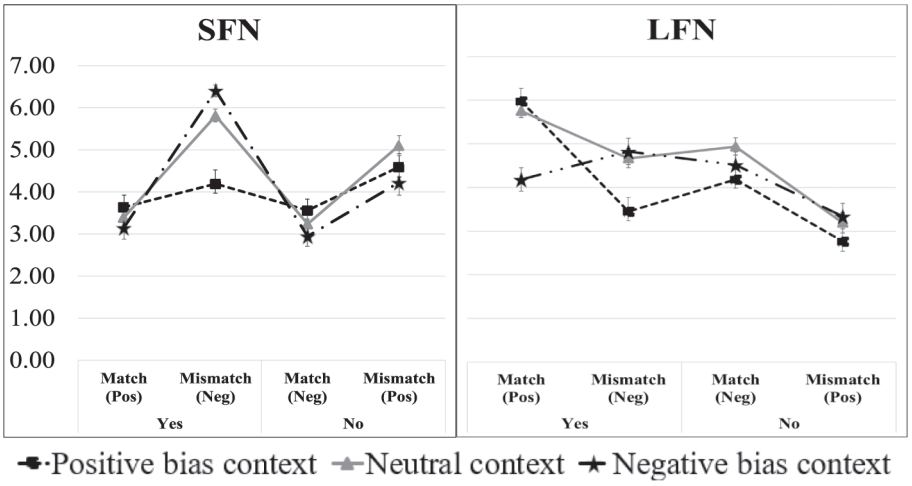

Fig. 1. Mean acceptability ratings of the answer patterns for Korean NPQs with SFN and LFN in the three different bias types.

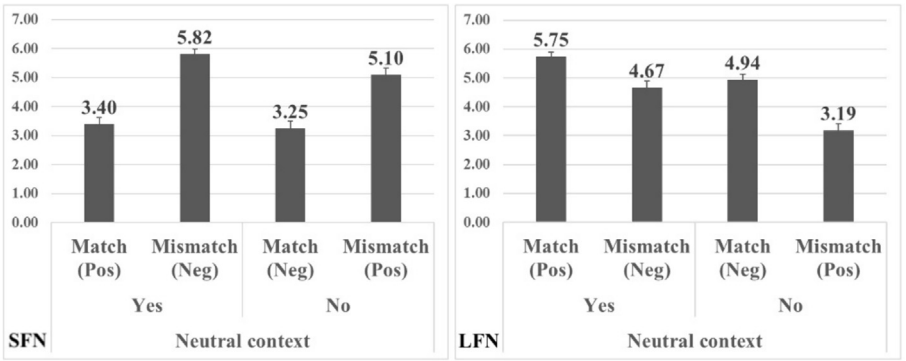

Fig. 2. Mean acceptability ratings of the answer patterns for Korean NPQs with SFN and LFN in the neutral context along with standard error bars.

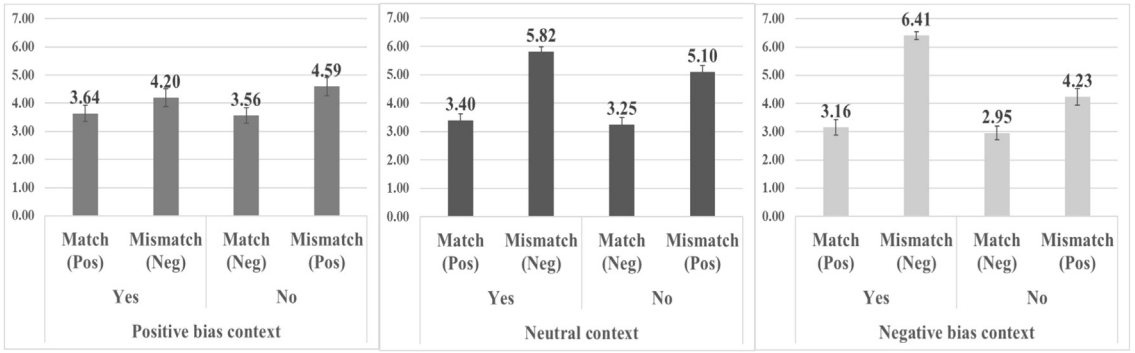

Fig. 3. Mean acceptability ratings of the answer patterns for Korean NPQs with SFN along with standard error bars.

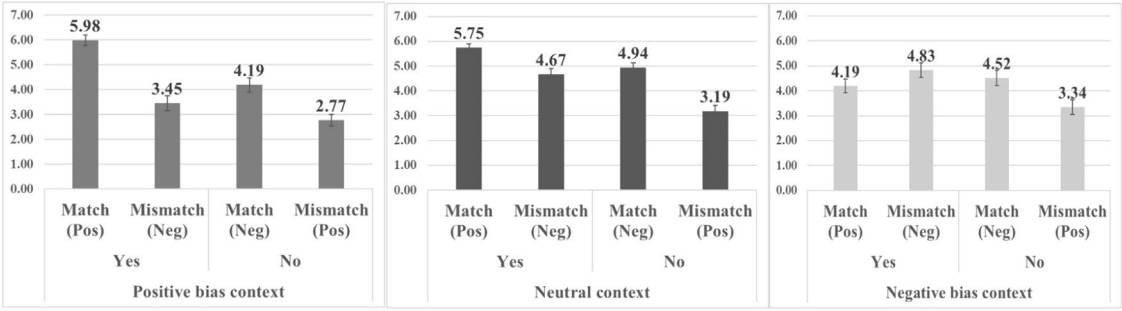

Fig. 4. Mean acceptability ratings of the answer patterns for Korean NPQs with LFN along with standard error bars.

the acceptability rating of the No-Pos condition was still higher than the No-Neg condition even in the negative bias context, maintaining the truth-based answering system.

In addition, there was no discernible positive bias effect on the acceptability ratings of the polarity-match answer patterns (Estimate = 0.277, Std. Error = 0.192, *t*-value = 1.443, $p = 0.149$), indicating that the acceptability ratings of the polarity-match answer patterns did not differ significantly in the neutral and positive bias contexts. However, the acceptability rating of the polarity-mismatch answer patterns was significantly lower in the positive bias context than in the neutral context (Estimate = −1.063, Std. Error = 0.192, *t*-value = −5.528, $p < 0.001$). The interaction effect between the positive bias context and the polarity mismatch was also significant (Estimate = −1.340, Std. Error = 0.272, *t*-value = −4.930, $p < 0.001$). This interaction effect means that the acceptability rating difference between the polarity-match and polarity-mismatch answer patterns was considerably smaller in the positive bias context than in the neutral context. It is also noteworthy that the Yes-Neg condition had a lower acceptability rating in the positive bias context than in the neutral context (5.82 in the neutral context > 4.20 in the positive bias context). These findings suggest that the preference for the truth-based answering system was somewhat suppressed in the positive bias context and although the positive bias had some effect, it was not strong enough to reverse its truth-based answering system with Yes.

At this point, it is worth noting that NPQs with SFN tend to favor a negative response over a positive one, as indicated by the acceptability rating difference between the Yes-Neg and No-Pos conditions in the neutral context (i.e., the two highest mean acceptability ratings expected from the truth-based answering system). Additionally, the positive bias context naturally attracts a positive response more than a negative one. Consequently, a conflict arises between the general tendency for the negative response for NPQs with SFN and the preference for a positive response triggered by the positive bias context. This discrepancy seems to explain the somewhat suppressed effect of the truth-based answering system in the positive bias context observed with SFN-marked NPQs.[11]

Then, consider Fig. 4, which shows the mean acceptability ratings of the answer patterns for Korean NPQs marked with LFN and their standard error bars.

Note first here that the mean acceptability ratings exhibited similar behavior in the neutral and positive bias contexts. In these two contexts, the mean acceptability rating of the polarity-match answer pattern was higher than that of its polarity-mismatch answer pattern counterpart (i.e., Yes-Pos > Yes-Neg and No-Neg > No-Pos). This indicates that the polarity-based answering system strategy was preferred over the truth-based answering system strategy when answering Korean NPQs with LFN in these two contexts. In addition, among the different answer patterns, the highest mean acceptability rating was observed for the Yes-Pos answer pattern, followed by the No-Neg, Yes-Neg, and No-Pos answer patterns. However, the mean acceptability rating patterns differed considerably in the negative bias context for NPQs with LFN.

The above-mentioned tendency was clearly seen in the statistical analysis as well. In the neutral context for NPQs with LFN, a significant polarity mismatch effect was observed (Estimate = −1.422, Std. Error = 0.219, *t*-value = −6.506, $p < 0.001$), indicating that the acceptability rating of the polarity-match answer patterns was higher than that of the polarity-mismatch answer patterns. However, no significant positive bias effect was found (Estimate = −0.266, Std.

[11] It is rather unexpected to see that the positive bias context did not boost the acceptability rating of the No-Pos condition in the positive bias context compared to the one in the neutral context. However, it still had the highest acceptability rating among the answer patterns in the positive bias context. We conjecture that this unexpected finding may be due to the general preference for answering Korean NPQs with Yes rather than with No. See Figs. 3 and 4 for this general tendency and we leave it to future research to examine this issue further.

Error = 0.192, *t*-value = −1.382, $p > 0.1$). These results can be systematically explained within the framework of the polarity-based answering system.

Notably, the positive bias effect emerged only in the polarity mismatch reference analysis (Estimate = −0.797, Std. Error = 0.192, *t*-value = −4.146, $p < 0.001$), meaning that the acceptability ratings of the polarity-match answer patterns in the neutral and positive bias contexts were not significantly different, but the acceptability rating of the polarity-mismatch answer patterns was lower in the positive bias context than in the neutral context. This implies that the positive context somewhat affected the acceptability of the polarity-mismatch answer patterns. Notice also that the Yes-Neg condition had a lower acceptability rating in the positive bias context (i.e., 4.67 in the neutral context > 3.45 in the positive bias context) and the No-Neg condition had a lower acceptability rating in the positive bias context (4.94 in the neutral context > 4.19 in the positive bias context) as well. This suggests that the positive bias had some effect in that it lowered the acceptability rating of the Yes-Neg condition rather than enhancing that of the Yes-Pos condition; similarly, it lowered the acceptability rating of the No-Neg condition instead of improving that of the No-Pos condition. Nonetheless, the positive bias effect did not influence strongly enough in such a way that it changed the general polarity-based answering system to the truth-based one with No. This accounts for the fact that the acceptability rating of the No-Neg condition was higher than that of the No-Pos condition even in the positive bias context, following the polarity-based answering system.

A somewhat different tendency was found when comparing the acceptability ratings of the answer patterns in the neutral and negative bias contexts. The acceptability rating of the polarity-match answer patterns was lower in the negative bias context than in the neutral context (Estimate = −0.977, Std. Error = 0.192, *t*-value = −5.081, $p < 0.001$) whereas the acceptability rating of the polarity-mismatch answer patterns did not differ significantly in the neutral and negative bias contexts (Estimate = 0.180, Std. Error = 0.192, *t*-value = 0.935, $p = 0.350$). This means that the negative bias only affected the acceptability of the polarity-match answer patterns, which are associated with the polarity-based answering system. Notably, the Yes-Pos condition had a lower acceptability rating in the negative bias context than in the neutral context (5.75 in the neutral context > 4.19 in the negative bias context). This suggests that the negative bias lowered the acceptability rating of the Yes-Pos condition and the negative bias effect was strong enough to change the canonical polarity-based answering system to the truth-based one with Yes.[12]

5. GENERAL DISCUSSION

The findings of our experiment do not fully support the judgments and results reported in the previous literature on the Korean answering system. Our findings provide further insight into possible variations of the Korean answering system controlled by negation forms and contextual bias types. The following includes a summary of our experiment findings and issues that we need to consider further.

First, our experiment results for answering patterns for NPQs in the neutral context may support syntax-based approaches claiming that SFN involves low negation while LFN involves high negation (Hagstrom, 2002; Kim, 2002; Han et al. 2007). However, note that the results could be accounted for by referring to pragmatic properties in line with Kim (1981), Chang (1984), Koo (1992), Park and Dubinsky (2019), and Wee (2019): LFN-marked NPQs are more strongly associated with a positive assumption. We could then assume that SFN-marked NPQs are more preferably associated with a negative assumption and thus their answer patterns follow the truth-based answering system, which has not been clearly discussed in previous literature. Our experiment results in the neutral context can thus be alternatively accounted for by pragmatic assumptions more strongly linked to SFN- and LFN-marked NPQs, respectively, instead of resorting to the different syntactic positions of the two negation forms.[13]

At this point, the syntax-based approach and the pragmatic assumption-based approach are the same. Both can successfully explain the overall preference for the truth-based answering system strategy when answering SFN-marked NPQs and the general preference for the polarity-based answering system strategy when answering LFN-marked NPQs in our experiment results in the neutral context. However, a closer examination points towards the pragmatic assumption-based approach rather than the syntax-based one. Note that the syntax-based approach cannot account for why the mean acceptability rating of the Yes-Neg condition was higher than that of the No-Pos condition

[12] One may wonder why the negative bias did not enhance the acceptability rating of the No-Neg condition in relation to the neutral context. As described in footnote 8, it seems to be related to the general preference for answering Korean NPQs with Yes rather than No.

[13] As a reviewer pointed out, to address the issue of whether SFN- and LFN-marked NPQs are indeed more associated with negative and positive assumptions, respectively, we need more rigorously-designed experimental research, where participants are given situations related to particularly positive or negative assumptions and then are asked to choose which type of NPQ (i.e., SFN- or LFN-marked one) they would preferably use. We leave this to future research.

in answering SFN-marked NPQs while the mean acceptability rating of the Yes-Pos condition was higher than that of the No-Neg condition in answering LFN-marked NPQs, as shown in Fig. 2 above. On the other hand, their differences are naturally accounted for by the pragmatic assumption-based approach. That is, since SFN-marked NPQs are more preferably associated with a negative assumption, the mean acceptability of the Yes-Neg condition should be higher than that of the No-Pos condition; in contrast, since LFN-marked NPQs are more favorably used with a positive assumption, the mean acceptability of the Yes-Pos condition should be higher than that of the No-Neg condition.

Next, as shown in Fig. 3, answering NPQs with SFN follows the truth-based answering system. Regardless of the three bias context types, the mean acceptability rating of the polarity-mismatch answer pattern (Yes-Neg and No-Pos) was higher than that of its polarity-match answer pattern counterpart (Yes-Pos and No-Neg). Statistically, the polarity mismatch effects in the positive and negative bias contexts were found the same as in the neutral context. This confirms that answering NPQs with SFN follows the truth-based answering system across the three different bias contexts under discussion. However, our experiment results regarding SFN-marked NPQs and their answer patterns in Fig. 3 do not mean that bias played no role in answering SFN-marked NPQs. Instead, they suggest that bias played some role in enhancing or lowering the acceptability of the conditions related to positive or negative bias types. However, their effect was not strong enough to change the general truth-based answering system to the polarity-based one. This then indicates that the negative assumption associated with SFN-marked NPQs had a stronger effect than particular contextual biases.

In contrast, as seen in Fig. 4, answering NPQs with LFN generally follows the polarity-based answering system. This means that the mean acceptability rating of the polarity-match answer pattern (Yes-Pos and No-Neg) was higher than that of its polarity-mismatch answer pattern counterpart (Yes-Neg and No-Pos). This preference for the polarity-match answer patterns over the polarity-mismatch answer patterns was particularly clear in the neutral and positive bias contexts. The positive bias context, in fact, served to lower the acceptability rating of the Yes-Neg condition instead of improving that of the Yes-Pos condition and it also lowered the acceptability rating of the No-Neg condition rather than enhancing that of the No-Pos condition. This implies that there was some positive bias effect in answering LFN-marked NPQs but it was not strong enough to reverse the general polarity-based answering system to the truth-based one with No. This in turn indicates that the positive assumption strongly associated with LFN-marked NPQs played a more important role than the positive bias in determining its answering system in the positive bias context. On the other hand, the negative bias context functioned to lower the acceptability rating of the polarity-match answer patterns instead of improving that of the polarity-mismatch answer patterns. In particular, the negative bias lowered the acceptability rating of the Yes-Pos condition rather than improving that of the Yes-Neg condition and the former was higher than the latter, observing the truth-based answering system. This indicates that the negative bias had a stronger effect than the positive assumption linked to LFN-marked NPQs with Yes.

6. 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 paper, we discussed the effects of different negation forms and bias types in answering Korean NPQs from an experimental perspective.

Based on our experiment results in the neutral context, we could first observe that the polarity-mismatch answer patterns receive higher acceptability ratings than their polarity-match answer pattern counterparts when they involve SFN; on the other hand, when they involve LFN, the polarity-match answer patterns overall receive higher acceptability ratings than their polarity-mismatch answer pattern counterparts. The general distribution patterns of the acceptability ratings of the answer patterns for SFN- and LFN-marked NPQs and detailed comparisons of the acceptability ratings of some pairs of answer patterns indicate that they can be best accounted for by a pragmatic assumption-based approach rather than a syntax-based approach.

In addition, comparisons of the acceptability ratings of the answer patterns in the particular bias contexts in relation to those in the neutral context when answering SFN- and LFN-marked NPQs show that bias plays some role in that it enhances or lowers the acceptability ratings of the relevant answer patterns. However, in most cases, the bias effect is not strong enough to change its typical answering system linked to the negation form and its associated assumption type. Nonetheless, it is observed that the Yes-Neg answer pattern is more preferred than the Yes-Pos answer pattern in answering LFN-marked NPQs in the negative bias context, following the truth-based answering system. The results then indicate that both negation forms and bias types influence the variations of the Korean answering system to some extent, at least.

Our experiment results imply that the answering systems for NPQs in natural languages cannot be the syntax-based dichotomy between polarity-based and truth-based ones, as suggested by Holmberg (2013, 2016) and others. The

results support the previous observations that various grammatical factors play roles in employing the answering system (Farkas and Bruce, 2010; Farkas, 2011; Brasoveanu et al., 2013; Krifka, 2013; González-Fuente et al., 2015; Meijer et al., 2015; Roelofsen and Farkas, 2015; Tubau et al., 2015; Li et al., 2016; Claus et al., 2017; Kim, 2017; Goodhue and Wagner, 2018). As seen from the present study, factors like negation forms or discourse bias could also affect the choice of answering systems.

As far as we are aware, the research presented here constitutes the first experimental study on the Korean answering system, controlling two important factors that could affect its variations in a systematic and interactive way. The possible variations of the Korean answering system on the basis of negation forms and bias types found in the present study can make a significant contribution to interface studies that put an emphasis on the interactions among different grammatical components such as morphosyntax and discourse.[14] We believe that our study can serve as a pioneer work on the variations of the Korean answering system, inviting further empirical, experimental studies regarding the effects of other grammatical factors like intonation and predicate types for a better understanding of variations of the Korean answering system.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Jong-Bok Kim: Writing – original draft, Funding acquisition, Conceptualization. **Jungsoo Kim:** Writing – review & editing, Writing – original draft. **Yunju Nam:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Data curation.

Data availability

Data will be made available on request.

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[14] Our post-experiment interviews with some speakers also revealed that stativity of the predicate in question may also play a certain role in the answer patterns. Korean predicates are classified into stative (for adjectival) and non-stative (for verbal) so that we can have two different types of NPQs as in (i):

(i)	a.	Mimi	an	wa-ss-e?		(Non-stative)
		Mimi	NEG	come-PST-QUE		
		'Didn't Mimi come?'				
	b.	i	kes	an	kwiyew-e?	(Stative)
		this	thing	NEG	cute-QUE	
		'Isn't this cute?'				

Preferred responses for such examples seem to be different. For (ia), either the Yes-Neg answer pattern or the No-Pos answer pattern could be possible, but for (ib), a natural one is the Yes-Pos answer pattern, which follows the polarity-based answering system.

(ii)	a.	ung,	an	o-ass-e.	(Proper response to (ia))
		yes,	NEG	come-PST-DECL	
		'Yes, she didn't come.'			
	b.	ung,	kwiyew-e.		(Proper response to (ib))
		yes,	cute-DECL		
		'Yes, it is cute.'			

This implies that as for SFN-marked NPQs with a non-stative predicate as in (ia), a proper response seems to follow the truth-based answering system while as for SFN-marked NPQs with a stative one like (ib), a proper response seems to follow the polarity-based answering system. This difference has to do with the type of assumption we typically have for such examples. Non-stative examples like (ia) can be used with no particular assumption (or with a negative assumption as seen from our experiment results regarding SFN-marked NPQs) whereas stative examples like (ib) are typically used with a positive assumption. It is quite unnatural to ask this kind of stative NPQs when we expect a negative answer. If this is the case even for SFN-marked NPQs, the syntax-based approach is further challenged in determining the Korean answering system and the negative assumption more preferably associated with SFN-marked NPQs can also be overridden by predicate types. We leave it to future research to address this issue.

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COMPETING INTERESTS

No competing financial interests exist.

AUTHOR CONTRIBUTION STATEMENT

The research concept was conceived by Jong-Bok Kim and Jungsoo Kim. Yunju Nam assumed responsibility for the comprehensive execution and composition of the experimental component. Jungsoo Kim was tasked with authoring the introduction and discussion sections of the initial manuscript. Jong-Bok Kim provided oversight and guidance throughout the entirety of the research endeavor. The collaborative effort of all authors culminated in the joint composition of the manuscript.

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APPENDIX. RESULTS OF THE STATISTICAL ANALYSES FOR KOREAN SFN/LFN-MARKED NPQS AND THEIR ANSWER PATTERNS USING LINEAR MIXED-EFFECTS REGRESSION

(Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1).

(a) Reference: SFN, Neutral, Match

	Estimate	Std. Error	df	*t*-value	Pr(>|t|)	Signif.
(Intercept)	3.324	0.160	84.421	20.805	< 2e−16	***
LFN	2.004	0.157	1951.539	12.770	< 2e−16	***
Positive	0.277	0.192	1951.539	1.443	0.149	
Negative	−0.270	0.192	1951.539	−1.402	0.161	
Mismatch	2.137	0.219	80.320	9.777	0.000	***
LFN:Positive	−0.543	0.272	1951.539	−1.998	0.046	*
LFN:Mismatch	−3.559	0.222	1951.539	−16.036	< 2e−16	***
Positive:Mismatch	−1.340	0.272	1951.539	−4.930	0.000	***
LFN:Negative	−0.707	0.272	1951.539	−2.601	0.009	**
Negative:Mismatch	0.129	0.272	1951.539	0.474	0.635	
LFN:Positive:Mismatch	0.809	0.384	1951.539	2.104	0.036	*
LFN:Negative:Mismatch	1.027	0.384	1951.539	2.673	0.008	**

(b) Reference: SFN, Neutral, Mismatch

	Estimate	Std. Error	df	*t*-value	Pr(>|t|)	Signif.
(Intercept)	5.461	0.200	55.827	27.281	< 2e−16	***
LFN	−1.555	0.157	1951.532	−9.907	< 2e−16	***
Positive	−1.063	0.192	1951.532	−5.528	0.000	***
Negative	−0.141	0.192	1951.532	−0.732	0.464	
Match	−2.137	0.219	80.333	−9.777	0.000	***
LFN:Positive	0.266	0.272	1951.532	0.977	0.329	
LFN:Match	3.559	0.222	1951.532	16.036	< 2e−16	***
Positive:Match	1.340	0.272	1951.532	4.930	0.000	***
LFN:Negative	0.320	0.272	1951.532	1.179	0.239	
Negative:Match	−0.129	0.272	1951.532	−0.474	0.635	
LFN:Positive:Match	−0.809	0.384	1951.532	−2.104	0.036	*
LFN:Negative:Match	−1.027	0.384	1951.532	−2.673	0.008	**

(c) Reference: LFN, Neutral, Match

	Estimate	Std. Error	df	*t*-value	Pr(>|t|)	Signif.
(Intercept)	5.328	0.160	84.420	33.347	< 2e−16	***
SFN	−2.004	0.157	1951.539	−12.770	< 2e−16	***
Positive	−0.266	0.192	1951.539	−1.382	0.167	
Negative	−0.977	0.192	1951.539	−5.081	0.000	***
Mismatch	−1.422	0.219	80.320	−6.506	0.000	***
SFN:Positive	0.543	0.272	1951.539	1.998	0.046	*
SFN:Mismatch	3.559	0.222	1951.539	16.036	< 2e−16	***
Positive:Mismatch	−0.531	0.272	1951.539	−1.955	0.051	.
SFN:Negative	0.707	0.272	1951.539	2.601	0.009	**
Negative:Mismatch	1.156	0.272	1951.539	4.254	0.000	***
SFN:Positive:Mismatch	−0.809	0.384	1951.539	−2.104	0.036	*
SFN:Negative:Mismatch	−1.027	0.384	1951.539	−2.673	0.008	**

(d) Reference: SFN, Neutral, Mismatch

	Estimate	Std. Error	df	*t*-value	Pr(>|t|)	Signif.
(Intercept)	3.906	0.200	55.827	19.514	< 2e−16	***
SFN	1.555	0.157	1951.532	9.907	< 2e−16	***
Positive	−0.797	0.192	1951.532	−4.146	0.000	***
Negative	0.180	0.192	1951.532	0.935	0.350	
Match	1.422	0.219	80.333	6.506	0.000	***
SFN:Positive	−0.266	0.272	1951.532	−0.977	0.329	
SFN:Match	−3.559	0.222	1951.532	−16.036	< 2e−16	***
Positive:Match	0.531	0.272	1951.532	1.955	0.051	.
SFN:Negative	−0.320	0.272	1951.532	−1.179	0.239	
Negative:Match	−1.156	0.272	1951.532	−4.254	0.000	***
SFN:Positive:Match	0.809	0.384	1951.532	2.104	0.036	*
SFN:Negative:Match	1.027	0.384	1951.532	2.673	0.008	**

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