Hindi-Urdu *wh*-scope markers license sluices: A new argument for indirect dependency

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ABSTRACT

In Hindi-Urdu, there are two strategies for asking a question about a constituent in an embedded clause: *wh*-movement of the constituent into the matrix clause, or '*wh*-scope marking': adding a morphologically independent *wh*-word *kyaa* 'what' in the embedding clause, to indicate interrogation of the *wh*-XP in an embedded clause. I introduce novel data from ellipsis that suggests these constructions are semantically distinct: *wh*-scope marking constructions are able to antecede sluices that *wh*-movement constructions cannot. This suggests both *wh*-words are semantically interpreted (as in Dayal 1996; Lahiri 2002).

1 Introduction

Hindi-Urdu speakers have two ways of asking questions about what someone thought, said, believed, asked, etc (Mahajan 1990, Dayal 1993, Lahiri 2002, Manetta 2010).

(1) a. Venkat-ne kaun$_1$ soch-aa [ki t_1 Karthik-se baat kar-e-g-aa]
Venkat-ERG who think.PFV-MASC that Karthik-INSTR talk do-SJV-FUT-MASC
'Who is such that Venkat thought they will talk to Karthik?'

b. Venkat-ne kyaa soch-aa [ki kaun Karthik-se baat kar-e-g-aa]
Venkat-ERG what think.PFV-MASC that who Karthik-INSTR talk do-SJV-FUT-MASC
(Roughly) 'Who is such that Venkat thought they will talk to Karthik?'

(1a) shows overt movement of *kaun* out of the embedded clause. It appears in the clause in which it takes scope. In (1a), *kaun* 'who' remains embedded. A morphologically independent *wh*-word *kyaa* 'what' appears in the main clause to indicate interrogation of an embedded constituent. This is *scope-marking* (available in a variety of languages, Lutz et al. 2000, Dayal & Alok 2017).

In the use of both (1a) and (1b), the speaker asks a question about Venkat's thoughts, not a question about people who will talk to Karthik. But the question is asked differently. Theorists have differed on whether this difference is purely morphological, or whether there is a concomitant difference in the semantics. I build on the following observation to argue that there is a difference: the scope-marking construction licenses two kinds of sluices, whereas the *wh*-movement alternative licenses only one. Felicitous replies to (1a), the scope-marking construction, include both (2a) and (2b). But (1a) cannot be followed by (2b).

(2) a. Mujh-e pataa nahin kaun
1PS-DAT know NEG who
'I don't know who.'

b. Mujh-e pataa nahin kyaa (infelicitous as reply to 1a)
1PS-DAT know NEG what
'I don't know what.'

This paper asks what the meanings of (1a) and (1b) are. I argue that these meanings differ in what is being quantified over: only the meaning of (1b) involves quantification over the propositions that Venkat believes. This is best analyzed as resulting from the meaning of the scope-marker. Under a conventional meaning for *wh*-quantifiers, and uncontroversial assumptions about sluicing, this will be enough give rise to the difference observed.

1.1 Theoretical implications foreshadowed

If this analysis is correct, then it cannot be that (1a) and (1b) are semantically identical. This theory was proposed, for instance, by Mahajan (1990). He argued that the difference is eliminated on the LF-branch of syntax – that the embedded *wh*-XP substitutes for the scope-marker.[1] But then there would be no difference in the semantics (Dayal 1993; Lahiri 2002; Manetta 2011).

But equally, it will not do to claim the only difference in semantics is whether the *wh*-quantifier is interpreted *de re* or *de dicto*. Such a theory has been proposed by Manetta (2011). She treats the pair in (1) on analogy with English raising constructions, taking the *kyaa* in (1b) to be an uninterpreted piece of morphology. It is present only to satisfy EPP-like requirements, equally satisfiable by movement (as in 1a).

In this theory, *kyaa* does not contribute anything to semantics, but its absence has semantic consequences. If *kyaa* is absent, the *wh*-quantifier must move to that slot, forcing a *de re* reading. This theory differs from Mahajan's in that it does not *mandate* this movement at LF, allowing the embedded *wh*-XP to be interpreted *de dicto* when the scope-marker is absent. But *de re*/*de dicto* readings will not explain the difference in ellipsis-licensing, or the morphology of the *wh*-remnant of the sluice.

Manetta and Mahajan's theories are known as 'direct dependency' accounts, as the relation between the answer and the embedded *wh*-XP is direct, unmediated by the interpretation of *kyaa*. 'Indirect dependency' accounts, on the other hand, take *kyaa* to be interpreted as *what* (Dayal 1996; Lahiri 2002). This treats the relation between the answer and the embedded *wh*-XP as mediated: *kyaa* asks about the propositions that Venkat believes, but the embedded question restricts the relevant propositions to the ones about who will talk to Karthik.

In this sense, (1b) is like English (3) (but see Dayal & Alok (2017) for some differences between these constructions and scope-marking).[2]

[1] In this he builds on Chomsky's (1986) idea of an 'LF-affix'. See Kayne (1984), 24ff for a similar treatment of French *personne*.

[2] English does not allow embedding like **What does John think who will Bill talk to?*. In the Hindi-Urdu embedding case, the question is *John believes something, x, of the form Bill will talk to y. What is x?*. The main difference is a syntactic one, then: Hindi-Urdu allows ditransitive-like syntax for its attitude verbs in questions.

(3) What does John think? Who will Bill talk to?

The theoretical dispute is about the semantics of the questions in (1a) and (1b). An indirect dependency theory is vindicated if and only if *kyaa* in (1b) is assigned a (non-vacuous) denotation. The focus of this paper is not how to compositionally derive the meanings of (1a) and (1b) such that this difference follows (though a full theory would clearly require this), but I will argue that there is a difference in meaning, and it is explained if *kyaa* is assigned a non-vacuous denotation. That is, the indirect dependency theory is able to explain the contrast in ellipsis licensing, but the direct dependency theories are not.

1.2 Roadmap

This paper is organized as follows. In (2), I elaborate on the following fact: by allowing (2b) as a continuation, the scope-marking structure differed from both English *Who did John say will come*, and its Hindi-Urdu*wh*-movement correspondent. I then discuss the distribution of *de re/de dicto* ambiguities, and show in 2.1 that scope-marking structures and certain sluices pattern alike. In Section 3, I briefly outline my assumptions about sluicing, and compare the direct dependency theory to the indirect dependency theory. While the direct dependency theory can capture the distribution of *de re/de dicto* readings, it fails to do so in a way that correlates it with the forms used in sluicing. The indirect dependency theory does so straightforwardly.

2 *Wh*-scope marking licenses more sluices than overt *wh*-movement

It has been previously shown that Hindi-Urdu has sluicing (Merchant 2001; Bhattacharya & Simpson 2012; Gribanova & Manetta 2016; Mishra 2022). Sluicing requires an existential quantifier in its antecedent – Whether this existential quantifier is introduced as part of an ordinary NP or a *wh*-XP is immaterial for licensing sluicing – both may antecede sluices:

(4) a. John likes *someone* but I don't know *who*.

b. Who did John say he likes? I don't know who.

If this is diagnostic of existential quantification, we observe that attitude reports do not generally existentially quantify over propositions. The *wh*-remnant in (5a) cannot be understood as anaphoric to the propositions John expressed, but only to the individual that John claimed smells good.

(5) a. John said something smells good.
But I don't know what {~~smells good/John said smells good~~} exactly.

b. *John said something smells good. But I don't know what ~~John said~~ exactly.

If *John said something smells good* implicitly existentially-quantified over propositions, we would be able to understand the sluice as in (5b). But we cannot. This is supported by the contrast between (5a) and (6), which *explicitly* existentially quantifies over propositions.

(6) John said something about something smelling good.
But I don't know what {smells good/John said} exactly.

Here the sluice *can* be understood as anaphoric to the propositions John expressed – i.e., the way it cannot be understoof in (5a). This will be important, as Hindi-Urdu scope-marking constructions pattern like (6), but Hindi-Urdu *wh*-movement constructions pattern like (5a).

Hindi-Urdu patterns like English (5a): attitude verbs do not existentially quantify over propositions. In that a sluice containing *what* is infelicitous, but a sluice containing *who* is fine.

(7) Venkat-ne kahaa ki koi ay-e-g-aa... par mujh-e pataa
Venkat-ERG say.PFV-MASC that someone come-SJV-FUT-MASC but 1PS-DAT know
nahin kaun/#kyaa
NEG who/#what
'Venkat said that someone is coming, but I don't know who/#what.'

This again shows that there is no existential quantification over the propositions that serve as the content of what Venkat said. This all also holds when the antecedent is a question rather than a declarative.

(8) Who did John say was coming? . . . I don't know who/#what.

(9) a. Venkat-ne kaun_1 kahaa ki t_1 ay-e-g-aa?
Venkat-ERG who say.PFV-MASC that come-SJV-FUT-MASC
'Who did Venkat say was coming?'

b. . . . Mujh-e pataa nahin kaun/#kyaa
. . . 1PS-DAT know NEG who/#what
I don't know who/#what.

Example (9) uses *wh*-movement in the antecedent. However, if we use the scope-marking alternative to (9) instead, *kyaa* 'what' becomes felicitous in the sluice. This is showin in(10):

(10) a. Venkat-ne kyaa kahaa ki kaun ay-e-g-aa?
Venkat-ERG what say.PFV-MASC that who come-SJV-FUT-MASC
'Who did Venkat say was coming?'

b. . . . Mujh-e pataa nahin kaun/kyaa
. . . 1PS-DAT know NEG who/what
I don't know who/what.

Under our assumption that the available sluices diagnose existential quantification in the antecedent of the sluice, it is natural to say that the scope-marking construction *does* existentially quantify over the propositions Venkat expressed. That is, the antecedents in (9a) and (10a) differ in what they quantify over. This means there is an existential quantifier in (10a) that is absent in (9a), suggesting that *kyaa* introduces an existential quantifier. This would be vindication for the indirect

dependency theory. We see independent evidence for this conclusion as the *kyaa*-sluice in (10b) behaves semantically just like a scope-marking construction.

2.1 Silent and frozen: *wh*-XPs in scope-marking sluices take narrow scope

Lahiri (2002) observes that scope-marking forces low scope of the embedded *wh*, a 'scope-freezing' effect. Unlike English (11), which shows a *de re/de dicto* ambiguity, Hindi-Urdu (12) is unambiguous.

(11) How many books does John think that Bill read?
(a) = What is the number such that John thinks that Bill read that number of books? (narrow scope of *wh*)
(b) = What is the number of books such that John thinks that Bill read those books? (wide scope of *wh*)

The (a)-interpretation requires John to have a number in mind – the *wh*-XP takes narrow scope with respect to the embedding predicate *think*. (b), in contrast, does not require John to think thoughts about numbers. (b) is the reading targeted when John thinks Bill read the entire pile of books in his office, but does not know how many books are in the pile. Here, the *wh*-XP takes wide scope with respect to the embedding predicate.

This ambiguity is absent in Hindi-Urdu *wh*-scope marking, where only the *de dicto* reading is available.

(12) Ramesh kyaa soc-t-aa hai [ki Raam-ne kitn-ii kitab-e
Ramesh what think-PFV-MASC be.PRES that Raam-ERG how.many book.FEM-PL
padh-ii
read.PFV-FEM
'What is the number such that Ramesh thinks that Raam read that number of books?' (narrow scope)
#'What is the number of books such that Ramesh thinks that Raam read those books?' (wide scope)

Only *de dicto* radings are available here. So, unlike English, Hindi-Urdu forces the low scope of *kitnii* 'how many' in a scope-marking construction. Ramesh *must* have a number in mind.

Then, *kitnii* does not LF-move into the higher clause, as it would outscope the embedding predicate *soctaa* 'think'. This is considered decisive evidence against Mahajan's LF-raising theory, which would generate only *de re* readings of the question, rather than only *de dicto* readings. The scope-freezing argument is then a very powerful argument against an LF-movement account (Bhatt, 2016).

We can see similar effects in sluicing. In the scope-marking construction, and only the scope-marking construction, there are two questions expressed, which can be targeted for sluicing independently. The set up is a little tricky, but the judgments are clear once the context is understood.[3]

[3]It may seem convoluted to use a false-belief context with three partiticipants. But this was required, as a whole

Context: Venkat, Bipin, and Aparna are talking before the party about what food to get. Venkat said that Mira will eat laddoos but not pedas. You know that he is mistaken: she will eat pedas, but not laddoos. Bipin and Aparna were not paying much attention to what Venkat said. So, Bipin asks Aparna:

(13) Venkat-ne kyaa kah-aa ki Mira kyaa kha-e-g-ii? (*wh*-scope marking)
Venkat-ERG what say.PFV that Mira what eat-SJV-FUT-FEM
(Lit.) 'What did Venkat say what Mira will eat?'

Aparna replies:

(14) Mujh-e pataa nahin kyaa
1PS-DAT know NEG what
'I don't know what.'

You, being a helpful speaker, want to answer the question Aparna was unable to. You can reply either *laddoo* or *peda* to this, and not be accused of getting things wrong. This means that there are two resolutions of Aparna's sluice available here:

(15) a. Aparna: I don't know what ~~Mira will eat~~

b. Aparna: I don't know what ~~Venkat said that Mira will eat~~

This does not hold for *wh*-movement. Suppose that Bipin had instead asked:

(16) Venkat-ne kyaa$_1$ kah-aa ki Mira t_1 kha-e-g-ii? (*wh*-movement)
Venkat-ERG what say.PFV that Mira eat-SJV-FUT-FEM
'What did Venkat say that Mira will eat?'

Aparna can still reply:

(17) Mujh-e pataa nahin kyaa
1PS-DAT know NEG kyaa
'I don't know what.'

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question must be used as the antecedent of the sluice. An ordinary indefinite NP is not as reliable as speakers disallow an indefinite in the relevant context, as (ii) shows:

(i) Venkat-ne yeh kah-aa ki koi ay-e-g-aa
Venkat-ERG this say.PFV-MASC that someone come-SJV-FUT-MASC
'Venkat said this: someone will come.'

(ii) ??Venkat-ne kuch kah-aa ki koi ay-e-g-aa
Venkat-ERG something say.PFV-MASC that someone come-SJV-FUT-MASC
(Lit.) 'Venkat said something that someone will come.'

At present, I have no explanation for the contrast. It could be to do with the interpretation of the immediately pre-verbal position as a TP-internal focus position (Manetta, 2011), but I leave an elaboration to future work.

But here, you can reply only *laddoo* to (17). It would be censurable to reply *peda* here. This is despite the fact that you know Mira will not eat laddoo; only peda. So, as a reply to (16), the sluice can only be interpreted as an indirect question about what Venkat said, *not* about what Mira will eat. Only one interpretation of Aparna's sluice is available here.

(18) a. Aparna: I don't know what ~~Venkat said regarding what Mira will eat~~

b. *Aparna: I don't know what ~~Mira will eat~~

Given conventional assumptions about sluicing, this suggests that the antecedent of the sluice quantifies over things Venkat said, in addition to things Mira will eat. Only the scope-marking structure has *two wh*-XPs – one an argument of *eat*, the other an argument of *say*. This is why it has two possible sluiced continuations, but why *wh*-movement constructions have only one possible sluice. When the embedded *wh*-XPs is *kyaa*, sluices with scope-marking antecedents can have two interpretations, but sluices of sentences with *wh*-movement in the antecedent can only have one interpretation.

It is important to show that the morphological form of the *wh*-XP is irrelevant. The previous examples used *kyaa* 'what' as the embedded *wh*-XP, making it morphologically identical to the scope-marker. But we can construct similar scenarios with a different *wh*-XP, like *kaun* 'who', and observe the same scope-freezing effect.

Context: Venkat, Bipin, and Aparna are talking before the party. Venkat said that Deepika will come to the party, and that Karthik will not. You know that he is mistaken: Karthik will come, but Mira won't. Bipin and Aparna were not paying much attention to what Venkat said. So, Bipin asks Aparna:

(19) Venkat-ne kyaa kah-aa ki kaun ay-e-g-aa?
Venkat-ERG what say.PFV that who come-SJV-FUT-MASC
(Lit.) 'What did Venkat say who will come?'

Aparna replies:

(20) Mujh-e pataa nahin kaun
1PS-DAT know NEG who
'I don't know who.'

You can reply either *Deepika* or *Karthik* to this, so two resolutions of Aparna's sluice are available here:

(21) a. Aparna: I don't know who ~~is coming~~

b. Aparna: I don't know who ~~Venkat said is coming~~

As is expected, things would be different if Aparna had replied:

(22) Mujh-e pataa nahin kyaa
1PS-DAT know NEG kyaa
'I don't know what.'

Here, you can reply only *Deepika* to (14), though you know Mira is not coming to the party. A sluice with *kyaa* 'what' as the remnant here can only be interpreted as a question about what Venkat said. This is, of course, partly because you can ask *What did he say?*, but not *#What is coming to the party?* (in this context). But the examples above in (13) and (16), which control for which *wh*-XPs are used, show that it is not purely down to the morphological form of the *wh*-remnant, but is in fact about the antecedent of the sluice.

2.2 Summary of the empirical claim

This section has presented two related observations. The first is that *wh*-movement structures in Hindi-Urdu are not able to license the same sluices as scope-marking constructions:

(1) a. Venkat-ne kaun$_1$ soch-aa [ki t_1 Karthik-se baat kar-e-g-aa]
Venkat-ERG who think.PFV-MASC that Karthik-INSTR talk do-SJV-FUT-MASC
'Who is such that Venkat thought they will talk to Karthik?'

b. Venkat-ne kyaa soch-aa [ki kaun Karthik-se baat kar-e-g-aa]
Venkat-ERG what think.PFV-MASC that who Karthik-INSTR talk do-SJV-FUT-MASC
(Roughly) 'Who is such that Venkat thought they will talk to Karthik?'

(2) a. Mujh-e pataa nahin kaun
1PS-DAT know NEG who
'I don't know who.'

b. Mujh-e pataa nahin kyaa (infelicitous as reply to 1a)
1PS-DAT know NEG what
'I don't know what.'

Furthermore, it was shown that, with *wh*-movement antecedents, the sluices must be interpreted *de dicto* – that is, about the propositions an attitude-holder relates to. With scope-marking constructions, it seems that there are *two wh*-sites, and whether a *de re* or *de dicto* interpretation results depends in part on the form of the *wh*-remnant in the sluice.

(19) Venkat-ne kyaa kah-aa ki kaun ay-e-g-aa?
Venkat-ERG what say.PFV that who come-SJV-FUT-MASC
(Lit.) 'What did Venkat say who will come?'

(20) Mujh-e pataa nahin kaun (ambiguous *de re/de dicto*)
1PS-DAT know NEG who
'I don't know who (is coming/Venkat said is coming).'

(22) Mujh-e pataa nahin kyaa ('I don't know what ~~Venkat said.~~' = *de dicto* only.)
1PS-DAT know NEG kyaa
'I don't know what.'

When the *wh*-remnant is unambiguously the scope-marker, the question must be about the attitude holder's thoughts. But when it is the embedded *wh*, the sluice is ambiguous, allowing both *de re* and *de dicto* readings.

In allowing (22) as a continuation at all, the scope-marking structure differed from both English *Who did John say will come*, and its Hindi-Urdu*wh*-movement correspondent. This strongly suggests that the scope-marker is what semantically licenses the *wh*-quantifier *kyaa* 'what' in the sluice, by existentially quantifying over the propositions that Venkat said.

3 The direct dependency and indirect dependency theories compared

I will first briefly outline my assumptions about sluicing, noting an important caveat about my exposition (though it may be of little theoretical substance). I then sketch an analysis in the direct dependency theory, and show that it cannot explain the data from the previous section. The only semantic difference the direct dependency theory sees between scope-marking and *wh*-movement structures is the scope of the *wh*-quantifier with respect to the embedding predicate. The indirect dependency analysis, however, claims that there is not only a difference in *where* quantifiers take scope, but also *how many* quantifiers there are. This allows it to explain why scope-marking structures license *more* sluicies than *wh*-movement structures.

3.1 Assumptions about how sluicing is licensed

I assume a semantic requirement on ellipsis, familiar from Merchant (2001).

(23) Ellipsis of a constituent C is possible only if $[\![E]\!]$ is e-GIVEN.

a. An expression E is e-GIVEN iff E has a salient antecedent A and
i) A entails the F-closure of E, and
ii) E entails the F-closure of A.

b. The F-closure of α is the result of replacing F(ocus)-marked parts of α with $\exists$-bound variables.
e.g., the F-closure of 'John loves *Mary*' = $\exists x.loves(john,x)$

This is a necessary condition on the licensing of ellipsis. Syntactic identity conditions, though they have been argued for (Chung 2013, Merchant 2013), are irrelevant for the data I focus on here.

A brief note on the use of 'entail': the sentence *I don't know what John said* entails '$\exists p_{st}$. John said p', i.e., there is something that John said. But if we assume a semantic representation as in (24), there is no variable over the propositions John said.

(24) $[\![$John said that something smells good$]\!]^{c,w}$ =
$\forall w'_s$ compatible with what John said in w_s, $\exists x_e$[*smells-good*(x) in w'] = 1

Here, there is no way of (non-vacuously) existentially binding a variable of type *st*.[4] Here I use the word 'entailment' loosely, as it is important to block the 'entailment' from *John said that something smells good* to *John said something*. But, of course, if John says that something smells good, there is something John said (namely, 'something smells good'). The sense of 'entailment' I mean here is closer to a proof-theoretic notion than a model-theoretic notion – it is the logical form of the sentence *John said that something smells good* that matters.

As there is no variable over propositions in *John said that something smells good*, the F-closure of 'John said that *someone* is coming' does not then entail the F-closure of 'I don't know *what* John said'. Blocking the entailment from 'John said *something* smells good' to 'John said something' also blocks the entailment from the F-closure of 'I don't know *what* John said' to the F-closure of 'John said that *something* smells good'. In a nutshell, the semantic condition is violated because neither the F-closure of *John said that something smells good* nor the F-closure of *I don't know what John said smells good* entails $\exists p_{st}[\textit{John said } p]$.

3.2 The direct dependency account fails

The direct dependency theory takes the scope-marker to be expletive. It then either raises the embedded *wh*-XP to the scope-marker's position at LF (Mahajan 1990), or it allows for long-distance licensing of the *wh*-XP in situ (Manetta 2010). We saw decisive evidence against the former view in Section 2.1, as it could generate only *de re* readings where only *de dicto* readings were unavailable.

However, Manetta (2010) allows for unselective binding of the embedded *wh*-XP, licensing it in-situ (therefore not moving and taking wide scope), without the scope-marker *kyaa* itself being assigned a denotation. Each *wh*-XP may move to the edge of its clause, but the most embedded *wh* stays low. I follow Manetta (2013) in assuming that all Hindi-Urdu*wh*s do move to the edge of their clause, and sluicing exceptionally triggers the Spell-Out of the copy in the clause-edge. This is a version of the direct dependency theory that does not overgenerate *de re* readings of scope-marking questions.

The derivation assigned to the scope-marking sluice is as follows, with $\exists_2$ used as the unselective binder of the embedded *wh*, $what_2$:

(25) *Direct dependency account of low scope of kyaa*$_2$ *with kyaa*$_1$ *as remnant:*
I don't know [$what_{expl1}$ $\exists_2$ ~~Venkat said t_1~~ [~~$what_2$ Mira will eat t_2~~]]

Semantically-vacuous expletive movement

But consider (9) and (10), repeated here. A difference in scope of *kaun* 'who' alone will not explain why *'I don't know what ~~Venkat said~~'* is a good response to (9a) but not to (10a).

[4]Here it is important that we talk explicitly about semantic representations, i.e., the *formulae* and not the functions they represent. That is, the syntax of the logical form is relevant. Perhaps this could be done in another system, without appeal to semantic representations. For convenience, I stick to this, despite the significant philosophical controversy surrounding this view.

(9) a. Venkat-ne kaun$_1$ kahaa ki t_1 ay-e-g-aa?
Venkat-ERG who say.PFV-MASC that come-SJV-FUT-MASC
'Who did Venkat say was coming?'

b. ...Mujh-e pataa nahin kaun/#kyaa
...1PS-DAT know NEG who/#what
I don't know who/#what.

(10) a. Venkat-ne kyaa kahaa ki kaun ay-e-g-aa?
Venkat-ERG who say.PFV-MASC that who come-SJV-FUT-MASC
'Who did Venkat say was coming?'

b. ...Mujh-e pataa nahin kaun/kyaa
...1PS-DAT know NEG who/what
I don't know who/what.

Nor can we explain this by appeal to assumptions about syntactic identity conditions on ellipsis. As was suggested at the end of the previous section, this asymmetry receives an explanation if we say *kyaa* 'what' introduces quantification over the things Venkat said. So while a direct dependency theory is able to explain the low scope of *wh*-XPs, the indirect dependency theory does it in a way which ties the scope fact together with the observations about sluicing in the previous section.

3.3 The indirect dependency analysis

In this subsection, I present the indirect-dependency analysis (following presentations in Dayal 1993; Lahiri 2002; Keine 2016). Indirect dependency assigns the scope-marker a denotation: semantic representation of the scope-marker contains an existential quantifier. The pair in (1) – repeated here as the (a) examples – have differing denotations – as in the (b) examples. For exposition, I assume that a question's denotation is the set of its possible answers, and I abstract from the representation of tense.

(26) a. Venkat-ne kaun$_1$ soch-aa [ki t_1 Karthik-se baat kar-e-g-aa]
Venkat-ERG who think.PFV-MASC that Karthik-INSTR talk do-SJV-FUT-MASC
'Who is such that Venkat thought they will talk to Karthik?'

b. $[\![(26a)]\!]^{c,w} = [\![[_{CP}$ who$_1$ C$_Q$ [Venkat think [t_1 Karthik-INSTR talk do]]]$]\!]^{c,w}$
$= \lambda p_{st} \exists x_e [p =$ *Venkat believes*$(x$ *will talk to Karthik*$)]$
$= \{$*Venkat thinks Mira will talk to Karthik, Venkat thinks Aparna will talk to Karthik,* ...$\}$

(27) a. Venkat-ne kyaa soch-aa [ki kaun Karthik-se baat kar-e-g-aa]
Venkat-ERG what think.PFV-MASC that who Karthik-INSTR talk do-SJV-FUT-MASC
(Roughly) 'Who is such that Venkat thought they will talk to Karthik?'

b. $[\![(27a)]\!]^{c,w} = [\![[$[what$_1$ C$_Q$ [Venkat think t_1]][who$_2$ C$_Q$ [t_2 Karthik-INSTR talk do]]]$]\!]^{c,w}$
$\lambda p_{st} \exists q_{st} \exists x_e [p = [$*Venkat believes* $q] \wedge q = \lambda w_s [x$ *talks to Karthik in* $w]]$

= {*Venkat thinks Mira will talk to Karthik, Venkat thinks Aparna will talk to Karthik,* ...}

To see the difference more perspicuously, though the sets are coextensional, the semantic formulae are different.

(28) a. $[\![(26a)]\!]^{c,w}$ =
= $\lambda p_{st} \exists x_e [p = \textit{Venkat believes}(x \textit{ will talk to Karthik})]$

b. $[\![(27a)]\!]^{c,w}$ =
$\lambda p_{st} \exists q_{st} \exists x_e [p = [\textit{Venkat believes } q] \wedge q = \lambda w_s [x \textit{ talks to Karthik in } w]]$

Both are questions about the person who Venkat thought will talk to Karthik (not about the person who will talk to Karthik). The details of the compositional semantics are not directly relevant here (but see Dayal 1993; Lahiri 2002 for syntactic and semantic details). What is relevant here is the difference in final semantic representations. Only the logical form in the scope-marking structure (27b) contains an existential quantifier over propositions. Even though the sets of answers are the same, their representation is different.

The difference in logical form would follow if, as the indirect dependency theory suggests, the existential quantifier over propositions is introduced with the scope-marker itself.

(29) $[\![\textit{kyaa}$ 'what'$]\!]^{c,w} = \lambda T_{st,t} \lambda W_{\langle st,\langle st,t\rangle\rangle} \lambda p_{st} \exists q_{st} [T(q) \wedge W(q,p)]$

(adapted from Lahiri 2002)

The scope-marker is an existential quantifier binding a propositional variable. T is the restriction on q, the embedded clause. q is the propositional variable bound by the scope marker. W is where the rest of its own clause will be fed into. In (1b), T is *x will talk to Karthik* and W is the propositions Venkat believes.

By introducing this existential quantifier with *kyaa*, the indirect dependency analysis is able to provide a logical form where the scope-marking question can antecede sluices where the *wh*-remnant quantifies over propositions. This was the main data from Section 2. By providing a contrast not only in *where* quantifiers take scope, but also *which* quantifiers there are, the indirect dependency analysis, unlike the direct dependency analysis, captures the contrast in ellipsis-licensing between scope-marking and *wh*-movement.

4 Conclusion

In this paper, I introduced new data from sluicing which helps decide between competing analyses of Hindi-Urdu questions, focusing on contrasts like in (30a) and (30b).

(30) a. Venkat-ne kyaa kah-aa ki Mira kyaa kha-e-g-ii? (*wh*-scope marking)
Venkat-ERG what say.PFV that Mira what eat-SJV-FUT-FEM
(Lit.) 'What did Venkat say what Mira will eat?'

b. Venkat-ne kyaa$_1$ kah-aa ki Mira t_1 kha-e-g-ii? (*wh*-movement)
Venkat-ERG what say-PFV that Mira eat-SJV-FUT-FEM
'What did Venkat say that Mira will eat?'

Is the scope-marker in (30b) an expletive, merely homophonous with *what*, or is it the garden-variety *wh*-word *what*? Dayal (1996) and Lahiri (2002) argued for the latter analysis. The data presented here supports their account, as the introduction of the scope-marker means there are more possible sluices than with *wh*-movement: the sluice in (31a) can be used as a reply to (30a), but cannot be used as a reply to (30b).

(31) a. Mujh-e pataa nahin kyaa ~~Mira kha-e-g-ii~~
1PS-DAT know NEG kyaa Mira eat-SJV-FUT-FEM
'I don't know what ~~Mira will eat~~.'
As a reply to (30a): ✓
As a reply to (30b): ✗

b. Mujh-e pataa nahin kyaa ~~Venkat-ne kah-aa~~ ~~ki Mira kha-e-g-ii~~
1PS-DAT know NEG kyaa Venkat-ERG say-PFV that Mira eat-SJV-FUT-FEM
'I don't know what ~~Venkat said that Mira will eat~~.'
As a reply to (30a): ✓
As a reply to (30b): ✓

This asymmetry between scope-marking and *wh*-movement receives explanation if the scope-marker has the semantics of an indefinite, but it is puzzling if the scope-marker has no semantics at all. The sluices also displayed other diagnostics of being a scope-marked structure. Namely, we saw frozen scope of the embedded *wh*-XP in a false belief context. Overall, the hypothesis that the scope-marker receives a denotation, behaves semantically like an indefinite, and is able to take scope, has received strong support from the data presented here.

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References

Bhatt, Rajesh. 2016. *Minimalist approaches to south asian syntax* 506–529. Berlin, Boston: De Gruyter Mouton. doi:doi:10.1515/9783110423303-007. https://doi.org/10.1515/9783110423303-007.

Bhattacharya, Tanmoy & Andrew Simpson. 2012. *Sluicing in indo-aryan: An investigation of*

bangla and hindi 183–218. Oxford University Press. https://academic.oup.com/book/10160/chapter/157713432.

Chomsky, Noam. 1986. *Knowledge of language: its nature, origin, and use* Convergence. New York: Praeger.

Chung, Sandra. 2013. Syntactic identity in sluicing: How much and why. *Linguistic Inquiry* 44(1). 1–44. doi:10.1162/LING_a_00118.

Dayal, Veneeta. 1993. Scope marking as indirect wh-dependency. *Natural Language Semantics* 2(2). 137–170. doi:10.1007/BF01250401.

Dayal, Veneeta. 1996. *Locality in wh quantification*, vol. 62 Studies in Linguistics and Philosophy. Dordrecht: Springer Netherlands. doi:10.1007/978-94-011-4808-5. http://link.springer.com/10.1007/978-94-011-4808-5.

Dayal, Veneeta & Deepak Alok. 2017. *Scope marking at the syntax-semantics interface*. Oxford University Press. doi:10.1093/acrefore/9780199384655.013.133.

Gribanova, Vera & Emily Manetta. 2016. Ellipsis in wh-in-situ languages: Deriving apparent sluicing in hindi-urdu and uzbek. *Linguistic Inquiry* 47(4). 631–668. doi:10.1162/LING_a_00225.

Kayne, Richard S. 1984. *Two notes on the nic* 23–46. De Gruyter. doi:10.1515/9783111682228-003.

Keine, Stefan. 2016. *Probes and their horizons*: University of Massachussetts Amherst dissertation. https://scholarworks.umass.edu/dissertations_2/723/.

Lahiri, Utpal. 2002. On the proper treatment of "expletive wh" in hindi. *Lingua* 112(7). 501–540. doi:10.1016/S0024-3841(01)00059-6.

Lutz, Uli, Gereon Müller & Arnim von Stechow (eds.). 2000. *Wh- scope marking*, vol. 37 Linguistik Aktuell/Linguistics Today. Amsterdam: John Benjamins Publishing Company. doi:10.1075/la.37. http://www.jbe-platform.com/content/books/9789027284303.

Mahajan, Anoop Kumar. 1990. *The a/a-bar distinction and movement theory*: Massachusetts Institute of Technology dissertation. https://dspace.mit.edu/handle/1721.1/13650.

Manetta, E. 2011. *Peripheries in kashmiri and hindi-urdu: The syntax of discourse-driven movement* Language Faculty and Beyond. John Benjamins Publishing Company.

Manetta, Emily. 2010. Wh-expletives in hindi-urdu: The *v*p phase. *Linguistic Inquiry* 41(1). 1–34. doi:10.1162/ling.2010.41.1.1.

Manetta, Emily. 2013. Copy theory in wh-in-situ languages: Sluicing in hindi-urdu, vol. 6, https://ojs.ub.uni-konstanz.de/jsal/index.php/jsal/article/view/54.

Merchant, Jason. 2001. *The syntax of silence: sluicing, islands, and the theory of ellipsis* Oxford studies in theoretical linguistics. Oxford; New York: Oxford University Press.

Merchant, Jason. 2013. *Polarity items under ellipsis* 440–462. Oxford University Press. doi:10.1093/acprof:oso/9780199602490.003.0022. https://academic.oup.com/book/12008/chapter/161320703. DOI: 10.1093/acprof:oso/9780199602490.003.0022.

Mishra, Anushree. 2022. The syntax of hindi-urdu sluicing. *Coyote Papers* 24. 72–83. http://hdl.handle.net/10150/665207.