Matching effects in the temporal and locative domains

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Abstract
The correlative strategy is used in a number of languages to achieve restrictive modification. The commonly discussed cases of ordinary correlatives involve abstraction over an individual variable. However, the correlative strategy is also used to abstract over variables that range over time, locations, manners, and degrees. Our goal in this paper is to investigate the extent to which the semantic treatment suggested for correlatives that involve abstraction over individual variables can be extended to the wider class of correlatives. We will limit our discussion to correlatives that abstract over times and locations in Hindi-Urdu and in Hungarian. In these languages, we find that a kind of matching effect that does not apply to ordinary correlatives applies to a subclass of temporal and locative correlatives. Having demonstrated these facts, we will consider explanations for this divergence between ordinary locatives and temporal/locative correlatives.

Key-words: temporal and spatial correlatives, matching effects, maximalization, individualization

1. Correlatives

1.1. Correlatives over individuals

Correlative constructions are schematized in Keenan (1985) as consisting of a correlative clause and a main clause. The correlative clause contains a relative phrase and the main clause contains a phrase that is anaphoric to the correlative clause, as represented schematically in (1):

(1) $[[_{\text{relative clause}} \ldots \text{NP}_{\text{rel}} \ldots] [_{\text{main clause}} \ldots \text{NP}_{\text{ana}} \ldots]]$

The schema in (1) leaves many aspects of the analysis of correlatives underdetermined, such as the nature of locality constraints that might hold between the correlative clause and the main clause and the correlative clause and the phrase in the main clause that is anaphoric to it. Another aspect worth discussing is the derivation of correlative constructions, with respect to whether the relative phrase undergoes correlative clause-internal movement, and whether the anaphoric element undergoes main clause-

internal movement. The proper analysis of these aspects of correlativization has to be done on a language-specific basis, as the correlative schema is realized in different ways in different languages. Consider for example (2), which provides examples of correlatives from Hindi-Urdu and Hungarian.[1]

(2) a. jo sale-par hai Maya us CD-ko khari:d-egi:
REL sale-ON be.PST.3SG Maya that CD-ACC buy-FUT.3FSG
'Maya will buy the CD that is on sale.' (Lit. 'What is on sale, Maya will buy that CD.')

b. Aki korán jött, azt ingyen beengedték.
REL.who early come.PST that.ACC freely PV.admitted.3PL
'Those who come early were admitted for free.'

In Hindi-Urdu, the relative phrase and the anaphoric demonstrative phrase can both stay in-situ. Hungarian obligatorily fronts both the relative phrase and the anaphoric demonstrative phrase. Our focus here will not be on the proper analysis of correlative constructions within any particular language, rather we will concentrate our attention on a particular type of correlative construction: correlatives that abstract over non-individual variables.

1.2. Correlatives over worlds, degrees and times

In many languages, correlative clauses are also used to realize *when*-clauses, *since*-clauses, *until*-clauses as well as comparatives and conditionals (on the latter, see Arsenijević (this volume) and Rebuschi (this volume)). The surface variation from construction to construction seems limited to the relative phrase and the proform. The rest of the syntax is essentially identical to that of ordinary correlatives. Like ordinary correlatives, there is a correlative clause that contains a relative phrase and a main clause that contains an anaphoric demonstrative phrase. The relative phrase is obligatorily present but the anaphoric demonstrative phrase can under circumstances be absent.[2] The following examples give illustration for all types of correlatives mentioned above:

(3) a. *conditionals* (Marathi, from Pandharipande (1997))
dzar tyāne abhyās kelā tar to pās hoīl.
if he.ERG studying do.PST then he pass be.FUT
'If he studies, then he will pass.'

b. *comparatives*
Rodman ke jitne tattoo hẼ, Jordan ke-paas
Rodman GEN how.many tattoo be.PRS.3PL Jordan near
us-se zyaadaa khitaab hẼ.
that-THAN more title be.PRS.3PL
'Michael Jordan has more scoring titles than Dennis Rodman has tattoos.' (Lit: How many tattoos Dennis Rodman has, Michael

Jordan has more scoring titles than that.)

c. *equatives*
John bhautiki-me jitnaa kushal hai, John-kaa
John physics-IN how.much good be.PST.3SG John-GEN
bhai gaNit-me utnaa kushal hai
brother math-IN that.much good be.PST.3SG
'John's brother is as good at math as John is at physics.'
(Lit: How good John is at physics, John's brother is that good at math.)

d. *when*-clauses
jab mE kamre-me ghus-aa, tab Mona gaa rahii
when I room-IN enter-PFV.MSG then Mona sing PROG.F
thii
be.PST.FSG
'When I entered the room, Mona was singing.'

e. *until*-clauses
jab tak John nahii aa jaa-taa, tab tak mÊ yahĩ:
when TILL John NEG come HAB.MSG then TILL I here
rahũgaa
stay.FUT.1MSG
'I will stay here until John arrives.'
(Lit: Till when John hasn't come, I will stay here till then)

f. *since*-clauses
jab-se tum yahã: aa-ye ho, tab-se Mona
when-SINCE you here come-PFV.MPL be.PRS.2PL then-SINCE Mona
khush hai
happy be.PST.3SG
'Mona is happy since you came here.'

The limited surface variation found from construction to construction thus pertains to lexicalization of the relative operator and the main clause anaphoric proform, as (4) sums up.

(4)

C*onstruction*	*Relative Phrase*	*Proform*
relativization	[...*jo* ...]	[...*vo*...]
	who	he/she
comparative	[...*jitnaa* ...]	[...*us-se jyaadaa* ...]
	how-much	that-THAN more
equative	[...*jitnaa* ...]	[...*utnaa* ...]
	how-much	that-much
conditional	[...*dzar*$_{Marathi}$...]	[...*tar*$_{Marathi}$ ...]
	if	then
when-clause	[...*jab*...]	[...*tab* ...]
	when	then
until-clause	[...*jab-tak* ...]	[...*tab-tak*...]

		when-TILL	then-TILL
since-clause		[...*jab-se*...]	[...*tab-se*...]
		when-SINCE	then SINCE

Given that the surface syntax of these different kinds of constructions seems to be essentially identical, one might expect the semantics of these different kinds of correlatives to be essentially identical too. Under a view of the syntax-semantics interface where the semantics interprets the syntax, any differences that we find in the semantics of these constructions should follow from the properties of the relative phrase and the demonstrative phrase and from the properties of the variable that is being abstracted over.

1.3. Maximalization in correlatives

Before we move on to examining correlatives of time and space in greater detail, let us take a look at the semantics of correlatives. Srivastav (1991) pointed out that the semantics of correlatives involve maximalization. If the relative phrase is singular, maximalization manifests itself in the form of definiteness over the predicate created by the abstraction in the correlative clause. This can be seen in (5a), which is only felicitous in a scenario where exactly one girl is standing. If no girl is standing or more than one girl is standing, (5a) cannot be used.

(5) a. jo laRkii khaRii hai, vo lambii hai
REL girl standing be.PST.3SG she tall be.PST.3SG
'The girl who is standing is tall.' (only one girl is standing, and she is tall.)

b. jo laRkiyã: khaRii hẼ, ve lambii hẼ
REL girls standing be.PRS.3PL they tall be.PRS.3PL
'The girls who are standing are tall.' (All the girls who are standing are tall.)

If the relative phrase is plural, as is the case in (5b), the correlative refers to all the girls standing, and the anaphoric phrase *ve* 'they' refers to the maximal 'sum' of the standing girls.

Assuming that correlatives involve a uniqueness operator that applies to a predicate and picks out the maximal element that the predicate holds for allows for a uniform characterization of singular and plural correlatives. (5a) involves a singular predicate while (5b) involves a plural predicate. In case of (5a), if there is more than one standing girl or if there is none, there will be no maxima and there will be a presupposition failure. With (5b), if there is no standing girl, there will be a presupposition failure but if there is more than one standing girl, the uniqueness operator will pick out the maximal plural entity that the predicate is true of. Here this will be all the standing girls. The semantics of uniqueness/maximalization relevant here seems to be

the same as that proposed for the English definite determiner *the*. We take maximalization to be an important aspect of the semantics of correlatives.

Before we move on to the trickier case of temporal correlatives, let us examine how the maximalization semantics suggested above apply to comparatives.

(6) Rodman ke-paas jitne tattoo hỄ,
Rodman near how.many tattoo be.PRS.3PL
Jordan ke-paas us-se zyaadaa khitaab hỄ.
Jordan near that-THAN more title be.PRS.3PL
'Michael Jordan has more scoring titles than Dennis Rodman has tattoos.' (Literally: How many tattoos Dennis Rodman has], [Michael Jordan has more scoring titles than that)

The correlative clause in (6) provides the degree predicate *how many tattoos Rodman has*. Maximalizing this predicate yields the maximal degree to which Rodman has tattoos, i.e. the total number of tattoos Rodman has. This number is picked up by the main clause demonstrative and the main clause just asserts that Jordan has more tattoos than that number. In other words, maximalization gives us the right semantics. The treatment of equatives is largely the same — the only difference being that the main clause introduces a statement of equality. We will now turn to temporal correlatives whose semantics do not fall out as straightforwardly.

2. Temporal and locative correlatives

As discussed earlier, correlatives over non-individual variables are structurally quite similar to correlatives over individual variables. On the surface the only difference resides in the form of the relative and demonstrative pronouns used and the connectives involved. In this section, we will illustrate the connectives and their use in correlative and non-correlative sentences from Hindi-Urdu only. We refrain from illustrating the same examples from Hungarian for reasons of space, and only give a summary of the connectives as well as the types of relative and demonstrative pronouns at the end of this section. The interested reader might also consult Lipták (2006) on the syntax of temporal correlatives in Hungarian.

Let us start the discussion with considering three kinds of connectives: the bare (zero) connective, whose semantic contribution will be the subject of further discussion; the connective that indicates the left boundary of a temporal or spatial path; and the connective that indicates the right boundary of a temporal or spatial path. Each of these is shown in the following examples:

(7) a. AT/IN: bare
Ram baarah baje / kal aa-yaa thaa
Ram 12 o'clock/ yesterday come-PFV.MSG be.PST.MSG
'Ram had come at noon/yesterday.'

b. TILL: *-tak*
Ram baarah baje-tak ghar-me thaa
Ram 12 o'clock-TILL home-IN be.PST.MSG
'Ram was at home until 12 o'clock.'

c. FROM/SINCE: *-se*
Ram baarah baje-se office-me hE
Ram 12 o'clock-FROM office-IN be.PST.3SG
'Ram is in the office since noon.'

The left boundary connective and the right boundary connective can also co-occur with each other. In this the Hindi-Urdu left boundary connective *-se* patterns with English *from* and not with *since*.[3]

(8) Ram baarah baje-se (le-kar) do baje-tak
Ram 12 o'clock-FROM take-CP two o'clock-TILL
office-me thaa
office-IN be.PST.MSG
'Ram was in the office from noon to 2pm.'

In Hindi-Urdu the left boundary temporal connective *-se* 'since/from' and the right boundary temporal connective *-tak* 'till' also have a spatial/locative usage. The following examples give illustration of all types of locative connectives.

(9) a. AT: bare
Ram vahã: rah-taa hai
Ram there stay-HAB.MSG be.PST.3SG
'Ram lives there.'

b. TO: *-tak*
Ram vahã:-tak dauR-taa hai
Ram there-TILL run-HAB.MSG be.PST.3SG
'Ram runs to there.'

c. FROM: *-se*
Ram vahã:-se dauR-naa shuruu kar-taa
Ram there-FROM run-INF start do-HAB.MSG
hai
be.PST.3SG
'Ram starts running from there.'

d. FROM X TO Y: *X-tak Y-se*
Ram Amherst College-se Umass-tak roz dauR-taa
Ram Amherst College-FROM Umass-TILL daily run-HAB.MSG
hai
be.PRS.3SG
'Ram runs daily from Amherst College to UMass.'

With these connectives in place, we can now construct temporal and locative correlatives. Again, we will only illustrate the Hindi-Urdu cases for reasons of space.

Let us start the discussion with temporal correlatives. In these, the correlative clause involves a temporal relative pronoun (*jab* in Hindi-Urdu) together with a connective, which can be zero (10a), the left boundary marker *-se* (10b), or the right boundary marker *-tak* (10c). In the relevant examples, the main clause also consists of a temporal demonstrative (*tab*) together with the connective found in the correlative clause. Consider the following examples, where LBM stands for the left boundary marker and RBM for the right boundary marker.

(10) a. [*when* + zero connective], [*then* + zero connective]
jab mE-ne kamre-me pravesh kiyaa, tab
when I-ERG room-IN enter do.PST.MSG then
Mona-ne naac-naa shuruu kiyaa
Mona-ERG dance-INF start do.PST.MSG
'When I entered the room, then Mona started dancing.'

b. [*when* + LBM],[*then* + LBM]
jab-se tum yahã: aa-ye ho,
when-SINCE you here come-PFV.MPL be.PRS.2PL
tab-se bhagwaan-kii kripaa-bhii yahã: aa gayii
then-SINCE god-GEN grace-also here come go.PFV.F
hai
be.PRS.3SG
'From the time that you have come here, God's grace has also come here.'

c. [*when* + RBM], [*then* + RBM]
jab-tak steshan khulaa thaa, tab-tak
when-TILL station open be.PST.MSG then-TILL
Mary ahã: baiThii rah-ii
Mary there seated stay-PFV.FSG
'Mary sat at the station as long as it was open.'

The corresponding locative correlatives are very similar structurally. The difference lies in the choice of the relative pronoun: instead of a temporal relative and demonstrative pronoun (*jab*/*tab*), a locative relative and demonstrative pronoun (*jahã:/vahã*:) is used.

(11) a. [*where* + zero connective], [*there* + zero connective]
Ram-ne jahã: zamiin khariid-ii hai, vo
Ram-ERG where land buy-PFV.F be.PRS.3SG he
vahĩ: makaan banaa-egaa
there.only house make-FUT.3MSG
'Where Ram bought land, there he'll build a house.'

b. [*where* + LBM], [*there* + LBM]
jahã:-se Ram dauR-taa hai, mẼ
where-FROM Ram run-HAB.MSG be PRS.3SG I
vahĩ:-se dauR-ũ:gaa
run-FUT.1MSG there.only-FROM
'I will run from exactly the location that Ram runs from.'

c. [*where* + RBM], [*there* + RBM]
jahã:-tak Ram dauR-taa hai, mẼ
where-TILL Ram run-HAB.MSG be.PRS.3SG I
vahã:-tak dauR-ũ:gaa
there-TILL run-FUT.1MSG
'I will run till where Ram runs.'

The temporal correlatives in (10) and the locative correlatives in (11) pattern with ordinary correlatives. The parallel with ordinary correlatives goes further — like ordinary correlatives, both temporal correlatives and locative correlatives allow for multiple correlatives. Such correlatives have more than one relative pronoun in the correlative clause and a corresponding number of demonstrative pronouns in the main clause. Consider the following examples, which show a multi-headed temporal and a multi-headed locative correlative.[4]

(12) a. [*when* + LBM, *when* + RBM], [*then* + LBM, *then* + RBM]
jab-se (le-kar) jab-tak Ravi Dilli-me thaa,
when-FROM take-CP when-TILL Ravi Delhi-IN be.PST.MSG
tab-se (le-kar) tab-tak Sita khush thii
then-FROM take-CP then-TILL Sita happy be.PST.FSG
'Sita was happy throughout the interval that Ravi was in Delhi.'

b. [*where* + LBM, *where* + RBM], [*there* + LBM, *there* + RBM]
jahã:-se (le-kar) jahã:-tak Ravi dauR-taa
where-FROM take-CP where-TILL Ravi run-HAB.MSG
hai mẼ-bhii vahã:-se (le-kar) vahã:-tak
be.PRS.3SG I-also there-FROM take-CP there-TILL
dauR-ũ:gaa
run-FUT.1MSG
'Ravi runs from point A to point B. I will also run from point A to point B.'

This section illustrated the form and use of temporal and locative connectives as well as the relative and demonstrative pronouns that occur in correlatives, which will be relevant for the discussion of matching effects in the next section. Before turning to these matching effects, we would like to provide a note about the Hungarian equivalents of the relevant connectives, as well as the relative and demonstrative pronominals that formed with the help of these.

The temporal domain in Hungarian makes use of the following connectives: *-kor* 'at', *-ig* 'till' and *óta* 'since'. The locative domain uses partly different connectives: the equivalent of the AT connective is *–nál/nél;* the equivalent of TILL/TO is *-ig*, and FROM is expressed as *–tól/től*, a connective that is also used in the temporal domain in constructions like (8) above.

Concerning the form of the relative pronouns that occur in correlatives, these are always built on a *wh*-item prefixed with the relative marker *a-* morpheme. The *wh*-item *mi* (or its variant *me*) 'what' gives rise to all temporal and some locative relative pronouns, and there is a specifically locative *wh*-pronoun, *hol* 'where' that can be used in the expressions of locative relatives.

The demonstrative pronominals that occur in the main clause of correlative constructions in Hungarian have two paradigms. The temporal paradigm is built on the distal demonstrative *az* 'that', and includes *akkor* 'that.AT' in the meaning of *then, addig* 'that.TILL.' in the meaning of *till then* and *azóta* 'that.SINCE' in the meaning of *since then.* In the latter meaning, *attól* 'that.FROM' can also occur (most always in combination with *kezdve/fogva* 'beginning'). The locative paradigm also uses *attól* and *addig* in the meaning of 'from a point/to a point in place'. Next to these items, there is an independent paradigm of locative demonstratives, which can be called the *o-* series. Thus we find *ott* 'there', which consists of the locative pronoun *o-* and a *–tt* AT connective, *oda* 'there.TO' (in the meaning of *to there*) and *onnan* 'there.FROM' (meaning *from there*). In these forms the AT, TO and FROM connectives are obsolete, non-productive connectives. Interestingly, *oda* and *onnan* can further combine with *–ig* and *–tól/től* to give *odáig* 'there.TO.TILL' (meaning *to that point*) and *onnantól* 'there.FROM.FROM' (meaning *from that point*). We will come back to the peculiarities of the pronominal paradigms in sections 3.3. and 4.2. below.

3. Matching effects

A major point of divergence between ordinary correlatives and temporal/spatial correlatives is that ordinary correlatives do not display 'matching' effects. Temporal correlatives in Hindi-Urdu as well as in Hungarian do. Spatial correlatives in Hindi-Urdu do not display these matching effects but a weaker version of the effect surfaces in Hungarian.

3.1. Matching effects with free relatives and correlatives

Matching effects are typically used to describe cases like the following which involve free relatives. See Grimshaw (1977), Bresnan and Grimshaw (1978) and Groos and van Riemsdijk (1981) among many others.

For a structure containing a free relative to be acceptable, the free relative needs to appear in a position where the case assigned to its *wh*-phrase (the internal case) is identical to the case assigned to the position where the free relative appears (the external case). Consider for example the case of German in (13). The grammatical (13a) has the free relative appear in a position that receives nominative case. The *wh*-phrase itself also receives nominative case. In the ungrammatical cases, there is a mismatch between the external case and the internal case.

(13) a. external case = internal case = nominative
Wer(NOM) nicht stark ist, muss klug sein.
who not strong be must clever be-INF
'Who is not strong must be clever.'

b. external case = nominative ≠ internal case = accusative
* Wen(ACC)/*Wer(NOM) Gott schwach geschaffen hat, muss
whom/who God weak create.PTCP has must
klug sein.
clever be-INF
'Who God has created weak must be clever.'

c. external case = nominative ≠ internal case = dative
* Wem(DAT)/*Wer(NOM) Gott keine Kraft geschenkt hat,
whom/who God no strength give.PTCP has
muss klug sein.
must clever be.INF
'Who God has given no strength to must be clever.'

In the above examples, we see an instance of case-matching. Next to case-matching, category matching is also displayed by some languages. In category matching the category of the free relative *wh*-phrase and the external environment have to be the same.

Having seen what matching phenomena are, we can now come back to correlatives. Crucially, matching effects are not displayed by ordinary correlative clauses. Consider for examples the following examples from Hindi (cf. 14) and Hungarian (cf. 15), which all involve distinct case markers on the relative phrase and the demonstrative:

(14) a. jis aadmii-ne mujhe naukrii dii thii
which man-ERG I.DAT job give.PFV.FSG be.PST.FSG
us-ko aaj medal mil-aa

dem-DAT today medal receive-PFV.MSG
'The man who had given me a job got a medal today.'

b. jis aadmii-ke-paas avEdh banduuk thii
which man-NEAR illegal gun be.PST.FSG
us-ko jurmaanaa de-naa paR-aa
dem-DAT penalty give-INF have.to-PFV.MSG
'The man who had an illegal gun had to pay a fine.'

(15) a. Akit meghívtunk, annak küldtünk
who.ACC PV.invite. PST.1PL that.DAT send.PST.1PL
meghívót.
invitation.ACC
'Whom we invited, we sent an invitation to those.'

b. Akinél fegyvert találnak, attól elveszik.
who.AT gun.ACC find.3PL that.FROM confiscate.3PL
'With whom they find a gun, they confiscate it from those.'

The absence of matching effects in these constructions makes a certain amount of intuitive sense since matching effects can be thought of as being a language particular way of resolving a morphological conflict: there are two cases, internal and external, but only one location where they can be realized. In correlatives, this conflict does not arise: the internal case is realized on the relative phrase inside the correlative clause (a free relative) and the external case is realized on the demonstrative phrase in the main clause.

3.2. Matching effects with temporal correlatives

Interestingly, what holds for correlatives abstractive over individuals when it comes to the absence of matching effects does not carry over to correlatives denoting other types of entities.

We start illustrating this with correlatives over times. Of these, section 1.2. illustrated three kinds of correlative clauses, which we referred to as *when*-clauses, *till when*-clauses, and *since when*-clauses. Corresponding to these we can have three kinds of main clauses: *then-clauses*, *till then*-clauses, and *since then*-clauses. Among these relative and main clauses, one might expect to find 9 possible combinations. In reality only some of these combinations are attested.

The matching cases are all grammatical, as the following examples show. The (a) examples are from Hindi-Urdu, the (b) ones from Hungarian.

(16) [*when*...] [*then*...]

a. jab Ram ghar lauT-aa (tab) Sita nahaa rahii
when Ram home return-PFV.MSG then Sita bathe PROG.F
thii
be.PST.FSG

'When Ram returned home, Sita was bathing.'

b. Amikor János megjött, (akkor) Mari TV-t nézett
what.AT János arrive.PST that.AT Mari TV-ACC watch. PST
'When János arrived, Mari was watching TV.'

(17) [*till when*...] [*till then*...]

a. jab-tak Ram yahã: thaa, (tab-tak) Sita khush
when-TILL Ram here be.PST.MSG then-TILL Sita happy
thii
be.PST.FSG
'During the duration Ram was here, Sita was happy.'

b. Ameddig János alszik, (addig) Mari TV-t néz
what.TILL János sleep that.TILL Mari TV-ACC watch
'While János sleeps, Mari watches TV.'

(18) [*since when*...] [*since then*...]

a. jab-se Ram yahã: aa-yaa hai,
when-SINCE Ram here come-PFV.MSG be.PRS.3SG
(tab-se) Sita khush hai
then-SINCE Sita happy be.PRS.3SG
'Sita is happy since Ram came.'

b. Amióta János dolgozik, (azóta) Mari
what. SINCE János work that.SINCE Mari
rendszeresen sportol.
regularly work.out
'Since the time that János has started working, since that time Mari works out regularly.'

Cases involving a *till/since when*-correlative clause and a mismatching *then*-clause are ungrammatical in both Hindi and Hungarian.[5]

(19) *[*till when*...] [*then*...]

a. *jab-tak Ram yahã: thaa, tab Sita khush
when-TILL Ram here be.PST.MSG then Sita happy
thii
be.PST.FSG
'Till the time Ram was here, then Sita was happy.'

b. *Ameddig János alszik, akkor Mari hazajön
what.TILL János sleep that.AT Mari come.home
'Till John sleeps, at that time Mary comes home.'

(20) *[*till when*...] [*since then*...]

a. *jab-tak Ram yahã: thaa, tab-se bhagwaan-kii
when-TILL Ram here be.PST.MSG then-SINCE god-GEN
kripaa yahã: hai]
grace here be.PRS.3SG
'Till when John was here, since then God's grace is here.'

b. *Ameddig János aludt, azóta Mari TV-t néz

what.TILL János sleep.PST that.SINCE Mari TV-ACC watch
'Till the time John was sleeping, since that time Mari is watching TV.'

(21) *[*since when*...] [*then*...]

a. *jab-se Ram yahã: aa-yaa hai,
when-SINCE Ram here come-PFV.MSF be.PRS.3SG
tab Sita khush thii
then Sita happy be.PST.FSG
'Since when Ram came here, then Sita was happy.'

b. *Amióta János dolgozik, akkor Mari elkezdett
what.SINCE János work that.AT Mari begin.PST
rendszeresen sportolni
regularly work.out-INF
'Since the time that János is working, then Mari started working out regularly.'

(22) *[*since when*...] [*till then*...]

a. *jab-se Ram yahã: aa-yaa hai,
when-SINCE Ram here come-PFV.MSG be.PRS.3SG
tab-tak Sita so-tii rah-ii
then-TILL Sita sleep-IMP.F stay-PFV.FSG
'Since when Ram came here, till then Sita kept sleeping.'

b. *Amióta János dolgozik, addig Mari
what.SINCE János works that.TILL Mari
rendszeresen sportolt
regularly work.out.PST
'Since the time János works, till that time Mari regularly worked out.'

Hindi-Urdu and Hungarian differ with respect to the grammaticality of the two remaining cases — in these the correlative clause is a *when*-clause and the main clause is a mismatching one:

(23) [*when*...] [*till then*...]

a. jab Ram Dilli-se lauT-aa thaa,
when Ram Delhi-FROM return-PFV.MSG be.PST.MSG
Sita-ne tab-tak tapasyaa kii thii
Sita-ERG then-TILL meditation do.PFV.F be.PST.FSG
'The time when Ram had returned from Delhi, Sita had meditated until then.'

b. * Amikor János megjött, addig Mari szomorú volt
what AT János arrive.PST that.TILL Mari sad be.PST
'The time that János came, Mari was sad till then.'

(24) [*when*...] [*since then*...]

a. jab Ram yahã: aa-yaa thaa tab-se
when Ram here come-PFV.MSG be.PST.MSG then-SINCE
bhagwaan-kii kripaa yahã: hai
god-GEN grace here be.PRS.3SG
'God's grace is here since the day that Ram came here.'

b. *Amikor János megjött, azóta Mari folyton
what. AT János arrive.PST that.SINCE Mari continuously
TV-t néz
TV-ACC watch.
'Since János arrived, Mari continuously watches TV.'

The pattern can be schematized as shown in Table 1.

@@ insert Table 1 here

It is worth noting that the difference between Hindi-Urdu and Hungarian seen above cannot be reduced to an exceptional property of Hindi-Urdu by which the *till/since* on the relative phrase can simply be left unpronounced.[6] The idea behind this putative reduction would be that the *till/since* markers inside the correlative clause are semantically unnecessary, and their presence is purely required by morphological reasons. If this was true, the difference between Hindi-Urdu and Hungarian would be a morphological difference only, with Hungarian imposing a strict matching requirement and Hindi-Urdu a weaker one. The Hungarian requirement would be 'only likes match' while the Hindi-Urdu requirement would allow for a bare *when* to match with any main clause then (bare, *till*, or *since*).

The reason we do not pursue this line of inquiry is because the presence of the *till/since* in the temporal correlative is subject to aspectual restrictions. If we insert the 'missing' *till/since* into the acceptable mismatch structures, the resulting sentences become aspectually odd.

(25) a. [*till when*...] [*till then*...]
#jab-tak Ram Dilli-se lauT-aa thaa,
when-TILL Ram Delhi-FROM return-PFV.MSG be.PST.MSG
Sita-ne tab-tak tapasyaa kii thii
Sita-ERG then-TILL meditation do.PFV.F be.PST.FSG
'The time when Ram had returned from Delhi, Sita had meditated until then.'

b. [*since when*...] [*since then*...]
#jab-se Ram yahã: aa-yaa thaa
when-SINCE Ram here come-PFV.MSG be.PST.MSG
tab-se bhagwaan-kii kripaa yahã: hai
then-SINCE god-GEN grace here be.PRS.3SG
'God's grace is here since the day that Ram came here.'

The oddness of (25) stems from the aspectual restriction imposed by *till/then*. *Till* seems to need a stative predicate and *since* seems to need a present perfect. *When*, on the other hand, by itself does not impose any such restrictions. If the *till/since* elements were present for purely morphological reasons, we would not expect such aspectual restrictions in these cases. Therefore we cannot treat the Hindi-Urdu grammatical mismatch cases of the [*when*...][*till/since then*...] sort as being the same at some level as the corresponding matching cases. In other words, the *when*-clauses here are really *when*-clauses and the *till/since when*-clauses in the matching cases are really *till/since-when* clauses.

3.3. Matching effects with locative correlatives

Section 2 has shown that locative correlatives and temporal correlatives look very similar. In fact, in Hindi-Urdu and to a more limited extent in Hungarian, even the connectives (*till, from/since*) are same. The only difference seems to be in the choice of the relative phrase/demonstrative phrase: *when/then* vs. *where/there*. Given these parallels, it is surprising that locative correlatives do not display matching effects in Hindi-Urdu. In Hungarian, the presence of matching effects depends upon the exact locative relative phrase used, as we will show later in this section.

The matching cases of locative correlatives in Hindi-Urdu have been considered earlier and are repeated here, with their Hungarian equivalents added to them.

(26) [*where*...] [*there*...]

a. Ram-ne jahã: zamiin khariid-ii hai,
Ram-ERG where land buy-PFV.F be.PRS.3SG
vo vahĩ: makaan banaa-egaa.
he there.only house make-FUT.3MSG
'Where Ram bought land, there he'll build a house.'

b. Ahol fúj a szél, ott hideg van
where blow the wind there cold be
'Where it is windy, it is cold there.'

(27) [*till where*...] [*till there*...]

a. jahã:-tak Ram dauR-taa hai, mÊ vahã:-tak
where-TILL Ram run-HAB.MSG be.PRS.3SG I there-TILL
dauR-ũ:gaa
run-FUT.1MSG
'I will run till where Ram runs.'

b. Ameddig tegnap elfutottam, addig/odáig
what.TILL yesterday run.PST.1SG that.TILL there.TO.TILL
ma kocsival mentem
today car.WITH go.PST.1SG

'To the place where I ran to yesterday, I went today by car.'

(28) [*from where*...] [*from there*...]

a. jahã:-se Ram dauR-taa hai, mẼ vahĩ:-se
where-SE Ram run-HAB.MSG be.PRS.3SG I there.only-FROM
dauR-ũ:gaa
run-FUT.1MSG
'I will run from exactly the location that Ram runs from.'

b. Ahonnantól futni kezdtem, onnantól
where.FROM run-INF begin.PST.1SG that.FROM.FROM
látszik a lábnyomom.[7]
show the footsteps.POSS.1SG
'From the place where I started running, my footsteps are showing.'

Other combinations of correlative and main clauses do not display matching effects, either in Hindi-Urdu:

(29) [*till where*...][*from there*...]

a. Ram jahã:-tak dauR-taa hai, mẼ vahã:-se
Ram where-TILL run-HAB.MSG be.PRS.3SG I there-FROM
auR-naa shuruu kar-u:ga
run-INF start do-FUT.1MSG
'I will start running from the point to which Ram runs.'

b. [*till where*...][*there*...]
Ram jahã:-tak dauR-taa hai, Sita vahĩ:
Ram where-TILL run-HAB.MSG be.PRS.3SG Sita there.only
rah-tii hai
stay-HAB.F be.PRS.3SG
'Sita stays at he location till which Ram runs.'

c. [*from where*...][*till there*...]
Ram jahã:-se dauR-taa hai, mẼ vahã:-tak
Ram where-TILL run-HAB.MSG be.PRS.3SG I there-FROM
dauR-naa shuruu kar-u:gã
run-INF start do-FUT.1MSG
'I will run till the location from which Ram starts running.

d. [*from where*...][*there*...]
Ram jahã:-se dauR-taa hai, Sita
Ram where-FROM run-HAB.MSG be.PRS.3SG Sita
vahĩ: rah-tii hai
there.only stay-HAB.F be.PRS.3SG
'Sita stays at he location from which Ram runs.'

e. [*where*...][*till there*...]
jahã: Sita rah-tii hai, mẼ vahã:-tak
where Sita stay-HAB.F be.PRS.3SG I there-TILL
dauR- ũ:gaa

run-FUT.3MSG
'I will run till where Sita lives.

f. [*where*...][*from there*...]
jahã: Sita rah-tii hai, mẼ vahã:-se
where Sita stay-HAB.F be.PRS.3SG I there-FROM
dauR-ũ:gaa
run-FUT.1MSG
'I will run from where Sita lives.

In Hungarian, the situation is slightly different. The locative paradigm clearly displays matching effects, even if a somewhat less strong sort than the temporal paradigm. We will illustrate this with *till where*-correlatives. As can be seen in the following examples, the non-matching combinations are degraded.[8]

(30) a. [*till where*...] [*there*...]
??Ameddig tegnap elfutottam, ott van egy fa
what.TILL yesterday run.PST.1SG there be a tree
'The place where I ran to yesterday, there is a tree there.'

b. [*till where*...] [*from there*...]
??Ameddig tegnap elfutottam, onnantól
what.TILL yesterday run.PST.1SG there.FROM.FROM
ma tovább mentem
today further go.PST.1SG
'From the place where I ran to yesterday, I went further from there today.'

It must be mentioned that next to the above instances of locative correlatives, there are also cases of correlatives that do not display matching effects, as the following examples demonstrate:

(31) a. [*where* ...] [*to there*...]
Ahol a karók vannak, oda paprikát vetek
where the sticks be.PL there. TOpaprika.ACC sow.1SG
'I will sow paprika where the sticks are.'

b. [*where*...] [*from there*...]
Ahol a karók vannak, onnan kiszedtem
where the sticks be-PL there.FROM remove.PST.1SG
a virághagymákat
the flowerbulbs-ACC
'I took out the flowerbulbs from the places where the sticks are.'

c. [*from where*...] [*there*...]
Ahonnan elköltözött az iskola, ott nincs könyvtár
where.FROM move.out.PST the school there be.NEG library
'There is no library in places where the school has moved out.'

d. [*from where*...] [*to there*...]
Ahonnan elköltözött az iskola, oda nem
where.FROM move.out. PST the school there.TO not
költöznek új családok
move new families
'New families do not move into places where the school has moved out.'

e. [*to where*...] [*there*...]
Ahova leszúrtam egy karót, ott virághagymák
where.TO push.PST.1SG a stick.ACC there flowerbulbs
vannak
be-PL
'At the place where I have put a stick, there are flowerbulbs.'

f. [*to where*...] [*from there*...]
Ahova leszúrtam egy karót, onnan
where.TO push.PST.1SG a stick.ACC there.FROM
kiszedtem a virághagymákat
remove.PST.1SG the bulbs-ACC
'I have removed the flowerbulbs from the places where I have put a stick.'

This class of locative pronominals could be called *pointwise* locatives, as the location expressed in these examples is not associated with a path, rather with a point. This contrasts with the forms in examples (30) which are clearly path-denoting. The appearance of the forms in (31) is moreover determined by the subcategorizational needs of the predicate at hand. For example, in (31f) the predicate in the correlative clause subcategorizes for the TO connective in *ahova* 'where. TO' and the predicate in the main clause subcategorizes for FROM connective in *onnan* 'there.FROM'. The lack of matching effects in these cases is thus on a par with the examples in (15).

According to the evidence of these examples, we can conclude that the matching effect in Hungarian seems to be keyed into the expression of an unselected temporal/spatial path argument. When we can be certain that the path argument is being manipulated as is the case with pathwise locatives in (31), we find matching effects.

3.4 Another difference between locative and temporal correlatives

Related to the fact that we find matching effects in Hindi-Urdu temporal correlatives but not in Hindi-Urdu locative correlatives, we can observe another contrast as well. *From/till* locative correlative clauses in Hindi-Urdu can combine with a demonstrative phrase to yield a DP that denotes a location. Thus both (34b) and (34c) are well-formed DPs that pick out the location to which Ram runs, and the location from which Ram starts running, respectively, as possible answers to (34a):

(34) a. tum Ram-se kahã: mil-oge?
you Ram-INSTR where meet-FUT.2MPL
'Where will you meet Ram?'
b. jahã:-tak vo dauR-taa hai, vahã:
where-TILL he run-HAB.MSG be.PRS.3SG there
'Till where he runs, there'
c. jahã-se vo dauR-naa shuruu kar-taa hai,
where-FROM he run-INF start do-HAB.MSG be.PRS.3SG
vahã:
there
'From where he starts running, there.'

But this is not possible with temporal correlatives. Here we cannot pick out the left boundary or the right boundary like we were able to with locative correlatives.

(35) a. tum Ram-se kab mil-oge?
you Ram-INSTR when meet-FUT.3MPL
'Where will you meet Ram?'
b. *jab-tak vo dauR-taa hai, tab
when-TILL he run-HAB.MSG be.PRS.3SG then
'*Till when he runs, then'
c. *jab-se vo dauR-naa shuruu kar-taa
when-FROM he run-INF start do-HAB.MSG
hai, tab
be.PRS.3SG then
'From when he starts running, then.'

To actually get at the left/right boundary, we need to switch to a plain *when*-clause and modify the predicate so that the *when*-clause picks out the point of culmination/initiation. Merely switching to an externally headed version does not help. This is similar to what we find with Hungarian externally headed temporal and locative relative clauses, which can be considered parallels of (34) and (35). In answers to questions like (34a) or (35a), Hungarian uses headed relative patterns that require matching connectives in the temporal case:

(36) a. Mikor találkozol / találkoztál Jánossal?
what.AT meet.2sg meet.pst.2sg János-with
'When will you meet János?'
b. *Akkor, ameddig fut.
that.AT when.TILL run.3sg
'Till when he runs.'
c. *Akkor, amióta fut.

that.AT when.SINCE run.3sg
'Since when he is running.'

And, unlike in Hindi-Urdu, the locative pattern is also just as bad as the temporal ones:

(37) a. Hol találkozol Jánossal?
where meet.2sg János-with
'Where will you meet János?'
b. *Ott, ameddig fut.
there where.TO run.3sg
'At the point to where he runs.'
c. *Ott, ahonnantól fut.
there where.TO.FROM run.3sg
'At the point where he runs from.'

Stepping back to the Hindi-Urdu cases in (34) and (35), it needs to be mentioned that by modifying the question so that it is about paths instead of points, the contrast between locative and temporal correlatives disappears, as the following show, where both locative and temporal answers (examples (b) and (c) respectively) are possible to the questions in (a). Note that the presence of TILL/SINCE on the demonstrative is obligatory.

(38) a. tum kahã:/kab-tak Ram-kaa piicchaa kar-oge?
you where/when-TILL Ram-GEN follow do-FUT.2MPL
'Till where/when will you follow Ram?'
b. jahã:-tak Ram jaa-egaa, vahã:-tak
where-TILL Ram go-FUT.3MSG there-TILL
'Till where Ram goes, till there.'
c. jab-tak Ram bhaag-egaa, tab-tak
when-TILL Ram run-FUT.3MSG then-TILL
'Till when Ram runs, till then.'

(39) a. tum kahã:/kab-se Ram-kaa piicchaa kar rahe
you where/when-FROM Ram-GEN follow do PROG.MPL
ho?
be.PRS.2PL
'From where/when will you follow Ram?'
b. jahã:-se Ram-ne bhaag-naa shuruu kiyaa
where-FROM Ram-ERG run-INF start do.PFV.MSG
thaa, vahã:-se
there-FROM be.PST
'From where Ram had started running, from there.'
c. jab:-se Ram-ne bhaag-naa shuruu kiyaa

when-SINCE Ram-ERG run-INF start do.PFV.MSG
hai tab-se
be.PRS.3SG then-SINCE
'Since when Ram had started running, since then.'

There are two ways to think about this pattern. The first is to treat the answers to questions as being derived via reduction of a full clause that consists of a correlative clause and a matrix clause. Then the pattern reduces to the previously observed fact that in Hindi-Urdu, temporal correlatives display 'matching' while locative correlatives do not.

But it has been noted that correlative clauses in Hindi-Urdu can also directly adjoin to the demonstrative phrase they modify (see Dayal (1996), Bhatt (2003)). Given this, it must be the case that the denotation of *till/since* temporal correlative clauses is such that when it modifies a demonstrative phrase, the resulting object does not denote a point of time. This object should, however, be able to combine with a *till/since* and then modify another clause. We will take this line of investigation further in our discussion of the temporal matching effect in Hindi-Urdu.

4. Explanations

We will attempt to provide a semantic explanation for the matching effect discussed in the previous section. This is in large part because the environments where this matching effect is found are not the kind of environments where one finds the classic morpho-syntactic matching effects familiar to us from free relative constructions, as we have shown in (14) and (15). We find matching effects in correlatives and in Hungarian even in headed relatives (cf. fn 5 and 8), both environments where a morpho-syntactic matching effect would be quite surprising. Next to the semantic ingredient, our explanation will also need to have a syntactic component to handle the variation that we found between Hindi-Urdu and Hungarian. Recall that matching effects in Hungarian are stricter than in Hindi-Urdu. Hungarian requires matching in locative correlatives also and disallows the '[*when*...] [*till/since then*...]' case allowed in Hindi-Urdu.

4.1. The first attempt: points of time

We need to start by making an assumption about what a *when*-clause denotes. Let us begin with the following proposal which is inspired directly by the semantics of plural individual correlatives discussed earlier in the paper.

(40) Putative Semantics for *when*-clauses:
a. *when*-clause gives the maximal interval/sum of points at

which the predicate holds — a point of time or an interval/sum of points depending upon the predicate

b. the *then* picks out this point/interval and the matrix clause must hold at this point/throughout this interval/sum of points

Note that this semantics runs into problems right away with durative predicates in *when*-clauses and with non-durative predicates in *then*-clauses. The following example shows such a problematic case: the *when*-clause picks out interval, but the *then*-clause is not durative:

(41) a. jab tum so rahe the, tab bagal-vaale
when you sleep PROG.MPL be.PST.MPL then neighboring
ghar-me chori ho gayii
house-IN theft be go.PFV.FSG
'While you were sleeping, a theft happened next door.'

b. jab tum so rahe the Madhu tab
when you sleep PROG.MPL be.PST.MPL Madhu then
aa-yii thii
come-PFV.F be.PST.FSG
'Madhu had come while you were sleeping.'

The source of this problem lies in our treatment of all temporal abstractions as involving an underlying AT connective. A more adequate treatment needs to take into account the contribution of aspect. We will not attempt such a treatment here but just note this problem with our proposed semantics of *when*-clauses.

Next let us consider the contribution of *till* and *since*.

(41) Assuming *then* refers to a point of time (see Iatridou et al. (2001), von Fintel and Iatridou (2002)):
   a. *till then* P is true if there is an interval whose right boundary is set by *then* and P holds throughout this interval. The left boundary is set by context.
   b. *since then* P is true if there is an interval whose left boundary is set by *then* and P holds throughout this interval. The right boundary is set by tense.

(42) Setting the left boundary with *until*:
   a. (Talking about a graduate student who graduated in 1999.) Marlyse was at Harvard until 1999.
   (This does not require that she was at Harvard all her life.)
   b. I was at IIT Kanpur until 1993. Then I was at Penn until 1999. After that I was in Texas until 2004.

(43) Setting the right boundary with *since*:
   a. John is in London since 2002. (continues up to now)
   b. John was in London since 1999. (continues up to a point in the

past)

(44) Assuming *then* refers to an interval:
   a. *till then* P is defined if *then* picks out an interval with a linguistically specified right boundary. It is true if P holds throughout this interval.
   b. *since then* P is defined if *then* picks out an interval with a linguistically specified left boundary. It is true if P holds throughout this interval.

The next question that we need to answer is what *till/since when* correlatives denote. We consider two options. The first is that they pick out points of time and the second is that they pick out intervals, as summarized in (45a) and (45b). When it comes to maximalization, the difference between the two approaches is that the interval approach does not need to make reference to the direction of maximization.

(45) a. Point of time approach
      i. *till when* P picks out the latest point at which P holds (maximization (to the right) of the right boundary)
      ii. *since when* P picks out the earliest point at which P holds (maximization (to the left) of the left boundary)
   b. Interval approach
      i. *till when* P picks out the maximal interval bounded on the left by the contextually specified left boundary
      ii. *since when* P picks out the maximal interval bounded on the right by the contextually specified right boundary

Of the two approaches, the point of time approach makes the wrong predictions with respect to matching. It would allow the following to be possible, contrary to facts in Hindi (46a) and Hungarian (46b):

(46) *[*till when*...] [*since then*...]
   a. *jab-tak Ram yahã: thaa, tab-se bhagwaan-kii
      when-TILL Ram here be.PST.MSG then-SINCE god-GEN
      kripaa yahã: hai
      grace here be.PST.3SG
      'Till when John was here, since then God's grace is here.'
   b. *Ameddig János aludt, azóta Mari TV-t néz
      what.TILL János sleep.PST that.SINCE Mari TV-ACC watch
      'Till the time John was sleeping, since that time Mari is watching TV.'

There is no reason why the *till when*-clause could not give us a right boundary which could then be used as a left boundary by the *since then*-clause. That this is not possible suggests that what we get from the *till/since*

when-clause cannot be a point of time. This conclusion also fits well with the observation that *till/since-when* temporal correlatives do not form time-denoting DPs with a demonstrative phrase. In this they diverge from ordinary *when*-clauses which can and do combine with demonstrative phrases to form temporal definite descriptions.

4.2. The second attempt: intervals

Having seen that the point of time approach fails to account for matching effects in both Hindi-Urdu and Hungarian, the conclusion must be drawn that this approach is not viable. We need to see if the interval approach does a better job in this respect.

If we assume that *till/since when* clauses actually yield temporal intervals, we have greater success with providing an explanation for the matching effect. But to account for the facts, we need more than just plain intervals. What we need for modeling *till*/*since when*-clauses are intervals with distinguished right/left boundaries. In this model, *till when*-clauses will pick out an interval with a distinguished right boundary and *since when*-clauses will pick out an interval with a distinguished left boundary. In the case of multi-headed temporal correlatives, we will also need intervals with distinguished left and right boundaries.

Concerning *then*, we need to assume that it is by itself just a temporal variable that can range over points of time/ordinary intervals but it cannot denote a distinguished interval. If it ranges over points of time/ordinary intervals, it can stand by itself and modify a clause without the help of a temporal connective like *till*/*since*. However, when *then* is associated with a *till/since when*-clause, it can only denote an interval with a distinguished left/right boundary. In such a case, it cannot stand by itself nor can it directly modify a clause. For it to do so, a *till/since* connective is needed. Moreover, it has to be the right connective. If the interval has a distinguished right boundary, *then* must combine with a *till* and if it has a distinguished left boundary, *then* must combine with a *since*. This explains the matching effects observed, by ruling out the combinations [*till when*...][*since then*...] or [*till when*...][*then*...] as well as [*since when*...][*till then*...] and [*since when*...][*then*...].

While the above sketched interval approach seems promising, it is not clear how it can explain a set of facts that we have not accounted for yet. These concern the distinct behavior of Hindi-Urdu and Hungarian when it comes to allowing for [*when*...] [*till/since then*] combinations. As we have shown in section 3 (recall Table 1), the two languages differ such that Hindi-Urdu allows for such combinations, Hungarian does not. Consider the following examples repeated from above:

(47) [*when*...] [*till then*...]

a. jab Ram Dilli-se lauT-aa thaa, Sita-ne

when Ram Delhi-FROM return-PFV.MSG be.PST.MSG Sita-ERG
tab-tak tapasyaa kii thii
then-TILL meditation do.PFV.F be.PST.FSG
'The time when Ram had returned from Delhi, Sita had meditated until then.'

b. * Amikor János megjött, addig Mari szomorú volt
what.AT János arrive.PST that.TILL Mari sad BE.PST
'The time that János came, Mari was sad till then.'

(48) [*when*...] [*since then*...]

a. jab Ram yahã: aa-yaa thaa tab-se
when Ram here come-PFV.MSG be.PST.MSG then-SINCE
bhagwaan-kii kripaa yahã: hai
god-GEN grace here BE.PRS.3SG
'God's grace is here since the day that Ram came here.'

b. *Amikor János megjött, azóta Mari folyton
what.AT János arrive.PST that.SINCE Mari continuously
TV-t néz
TV-ACC watch.
'Since János arrived, Mari continuously watches TV.'

The behavior of Hindi-Urdu is the pattern that we expect on the basis of our model. In these examples the ordinary *when*-clause denotes a point of time, which serves as the left or right boundary of the distinguished interval denoted by *till*/*since then.*

How can we account for the presence of matching effects in Hungarian? Since we do not want the semantics to vary across languages, it must be the case that the ungrammaticality of the above Hungarian examples follows from something more language-specific. Unfortunately, at this point, we cannot offer any explanation of the observed facts, but we note that although (47b) and (48b) are ungrammatical, the [*when*...] [*since then*...] combination can be expressed in a grammatical way, using a less frequent form of *since then*: *akkortól* 'that.AT.FROM', which is built with the FROM connective *–tól/től*, added to the ordinary *then* form *akkor* 'that-AT'. Crucially, this form can surface in correlatives, and when it combines with a *when*-clause, it does not give rise to matching effects:[9]

(49) Amikor a szerver elküldi az üdvözlőlevelet,
what.AT the server send the welcome.letter.ACC
akkortól él a tagság.
that.AT.FROM live the membership
'Membership is active from the time when the server sends the welcome letter.'

The only speculation we can offer about this type of matching example is that some kind of parallelism effect can be at play here: the relative phrase

amikor and the demonstrative *akkor* are matching forms in [*when*…][*then*...] contexts, which might facilitate the acceptability of sentences like (49).

4.3. Explaining the difference between Hindi-Urdu and Hungarian in the temporal domain

The previous section has shown that the interval approach seems to be a promising approach to account for matching effects in correlatives in the temporal domain. The question is, does this approach carry over to the locative domain, too?

If the locative and the temporal domain were the same, we would expect that locative correlatives show the same kind of matching effects as temporal ones. This is, however, not what we find. As section 3.3 showed, Hindi-Urdu displays no matching effects of any sort in the locative domain. It is tempting to relate the absence of matching effects in Hindi-Urdu locative correlatives to the plausibly greater individuatability of locations over times. This squares well with the finding that *from/till* locative correlatives can easily combine with a demonstrative to denote a location, consider the following examples, repeated from (34) again:

(50) a. tum Ram-se kahã: mil-oge?
you Ram-INSTR where meet-FUT.2MPL
'Where will you meet Ram?'

b. jahã:-tak vo dauR-taa hai, vahã:
where-TILL he run-HAB.MSG be.PRS.3SG there
'Till where he runs, there'

c. jahã-se vo dauR-naa shuruu kar-taa hai,
where-FROM he run-INF start do-HAB.MSG be.PRS.3SG
vahã:
there
'From where he starts running, there.'

The demonstrative moreover can also take the form of the ordinary, non-locative *vo* 'that' phrase, which can be subject of a predicate nominal such a *place*, as the following example illustrates:

(51) Ram jahaaN-tak/se dauR-taa hai, vo
Ram where-TILL/FROM run-HAB.MSG be.PRS.3SG that
acchii jagah hai
good place be.PRS.3SG
'The place till/from where Ram runs, that's a good place.'

Intuitively, it is correct to say that spatial relations are better at providing points than temporal ones. This no doubt follows from the dimensionality differences between the two domains, the idea being that 3-dimensional

space allows for a better definition of points that 1-dimensional time. The explanation behind the lack of matching effects in Hindi-Urdu locatives might then follow from the fact that *where/there* as well as *from/to where/there* can make reference to both points as well as paths, unlike what happens in the temporal domain.

Yet, it is also clear that greater individuatability of locations is not a universal property, languages can differ with respect to what extent their syntax allows for it. Hungarian is clearly an example where *from/to where/there* cannot express a point in place, as was shown in (37) above. Neither can *from/to where* correlatives associate with an ordinary demonstrative that is subject to a predicate like *place* (compare the grammatical (51) above):

(52) *??Ameddig János futott, az szép hely.
what.TILL János run.PST that nice place
'The place where János ran to is a nice place.'

This shows that *from/to where* correlatives cannot express a point, only a path, and as the result of this, Hungarian locative correlatives do show matching effects, similarly to the temporal domain. Greater individuatability does enter the picture, but only to the degree that grammaticality judgments improve a bit compared to the temporal domain.

The different behavior of *from/to where* correlatives in Hungarian vs. Hindi-Urdu when it comes to reference to points and paths is what underlies the difference in matching effects in the locative domain in the two languages. There seems to be a lexico-semantic difference between the two languages in that *from/to/till* connectives in the locative domain are capable of expressing points in Hindi-Urdu, but not in Hungarian. The generalization that we arrived at, on the basis of these two languages is that if *from/to where* correlatives can denote a point, matching effects are missing.

While we cannot undertake the checking of the cross-linguistic validity of this generalization in the present article, we round off the discussion by showing that our generalization makes the right predictions for Dutch.[10] It seems that the Hungarian pattern is replicated in Dutch. To consider the case of Dutch, note first that temporal clauses show a matching effect. A *till*-temporal clause can only combine with a *till*-phrase in the main clause:

(53) Totdat Jan wakker werd, totdan/*sindsdien heeft
TILL.that Jan awake become.PST TILL.then /SINCE has
Marie TV gekeken.
Marie TV watch.PRTC
'Until the time that Jan woke up, Marie watched TV.'

Similarly to the temporal domain, non-matching cases in the locative domain sound weird:

(54) Tot waar toe Jan gerend heeft, tot daar toe ga ik ook rennen
till where to Jan run.PRTC has till there to go I also run.INF
'I will run to the place where Jan has run to.'

(55) ??Tot waar toe Jan gerend heeft, (van) daar (af) begin ik te rennen
till where to Jan run.PRTC has of there from begin I to run.INF
'I will begin to run from the place where Jan has run to.'

The problem is that the locative *tot waar toe*-clause denotes a path and as such it cannot be construed as the starting *point* which can be picked out by the main clause promominal in (55). As expected, a *tot waar toe*-clause cannot show up as subject of a nominal predicate denoting a place, either:

(56) *??Tot waar toe Jan gerend heeft is een fijne plek.
till where to Jan run has is a nice place
'The place where Jan run to is a nice place.'

The behavior of Dutch thus parallels Hungarian, reinforcing the conclusion above that it is the lexico-semantic property of certain connectives that determines the availability of matching in the locative domain. Given that Dutch does not evidently use correlative structures for the expression of all adverbial clauses (the examples in (53) have a different underlying structure for example), these facts show that matching effects in temporal/locative multi-clausal structures extend beyond correlative constructions.

5. Summary

This paper dealt with a particular kind of matching effect in the realm of correlative clauses that shows up in relativization over times and locations. Such a matching effect manifests itself in the fact that not all combinations of temporal/locative connectives are possible in the correlative and the main clause. To offer an explanation about this matching requirement and the variation it shows among two unrelated languages, Hindi-Urdu and Hungarian, we have reviewed properties of path and point denoting temporal and locative expressions and concluded that there are semantic constraints on the combination of these two types of entities, and lexico-semantic constraints on their realization in the form of connectives. We have also shown that matching effects of this sort are not confined to correlative and headed relative constructions alone, but characterize other types of adverbial clauses as well.

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[1] Here and in the examples below, we use the kind of Hindi orthography that represents retroflexes by capitalization, nasal vowels by following the vowel by the capitalized nasal, and long vowels by the doubling of the vowel. The glosses are: ACC: accusative; CP: conjunctive particle; DAT: dative; ERG: ergative; F: feminine; FUT: future; GEN: genitive; IMP: imperfective; LMB: left boundary marker; NOM: nominative, M: masculine; PFV: perfective; PL: plural; PRS: present; PST: past; PTCP: participle; PV: preverbal particle; RMB: right boundary marker; SG: singular. In the Hungarian examples, we only indicate agreement morphemes when these are different from 3 person singular, present tense agreement.

[2] Conditionals are an exception to this generalization. In conditionals, the relative phrase can be absent but the anaphoric marker is generally present. A further exceptionality of conditionals is that they do not reliably pattern with correlatives in all Indo-Aryan languages. In Hindi-Urdu, for example, the conditional marker is *agar*, which is not a relative pronoun. It is possible that conditionals are only diachronically related to correlatives in Hindi-Urdu. We will not consider conditionals further in this discussion.

[3] CP in the gloss here stands for conjunctive participle, a term we have adopted from the descriptive literature on Hindi-Urdu. Ordinarily V-CP contributes a meaning along the lines of 'having V-ed'. Here, however, 'le-kar' forms a fixed expression that optionally appears between a left boundary marker and a right boundary marker. See also example (12).

[4] The multi-headed temporal and spatial correlatives shown below seem to be the only ones possible (next to cases where a temporal/spatial abstraction combines with an individual abstraction, not illustrated here). Other combinations lead to ungrammaticality. For example it is not possible to have two relativizations with a left boundary marker or two relativizations with a right boundary marker. Further we cannot have a multi-headed temporal/spatial correlative where one of the abstractions involves the bare/zero connective and the other involves a left/right boundary marker. The fact that it is impossible to combine a bare connective abstraction with a left/right boundary abstraction might indicate that the way bare connective adverbials modify the matrix clause is distinct from the way left/right boundary marker adverbials modify the matrix clause. The intuition is that the former involve reference to points while the latter modify a temporal/spatial interval/path argument of the clause.

[5] Temporal correlatives in Hungarian have headed relative counterparts where the main clause demonstrative functions as the head. Matching restrictions apply to these headed relative structures as well, as the following show:

(i) a. Akkor amikor János megjött, Mari TV-t nézett.
that.AT when János arrive.PST Mari TV-ACC watch.PST
'When John arrived, then Mari was watching TV.'

b. *Azóta amikor János megjött Mari TV-t néz.
then.SINCE when János arrive.PST Mari TV-ACC watch
'When John arrived, since then Mari is watching TV.'

c. *Addig amikor János megjött Mari TV-t nézett.
then.TILL when János arrive.PST Mari TV-ACC watch.PST
'When John arrived, till then Mari was watching TV.'

The corresponding headed structures are marginal in Hindi.

[6] We thank Boban Arsenijević for making us consider this option.

[7] Examples like this can be constructed, but are not naturally occurring data. *Ahonnantól* is almost always used to refer to location in the abstract sense.

[8] Like with temporal correlatives, locative correlatives have headed counterparts that display matching effects.

(i) a. Addig/odáig ameddig tegnap elfutottam,
that.TILL/ there.TO.TILL what.TILL yesterday PV.run.PST.1SG
ma kocsival mentem.
today car.WITH go.PST.1SG
'To the place where I ran yesterday, I went by car today.'

b. *Ott ameddig tegnap elfutottam, van egy nagy fa.
there what.TILL yesterday PV.run.PST.1SG be a big tree
'The place to where I ran yesterday, there is a big tree there.'

c. *Onnantól ameddig tegnap futottam, ma
there. FROM.FROM what.TILL yesterday run.PST.1SG today
tovább mentem.
further go.PST.1SG
'The place to where I ran yesterday, from there I went further today.'

The non-matching headed structures seem to be worse than their locative correlative counterparts.

[9] It needs to be noted that *akkortól* and *amikortól* most usually occur in the headed pattern, but this does not affect our point here, as temporal relatives of the headed type also show matching effects (see footnotes 4 and 7 above).

[10] We thank Marcel den Dikken for providing us with the Dutch examples in this section, as well as for calling our attention to the relevance of examples (51)- (52) for our theory of the lack of matching effects in locatives.