"Sakha *da(qanɨ)*: Negative Polarity, Conjunction, and Focus"

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Tu+5

1 Introduction

• The Siberian Turkic language Sakha (also known as Yakut), has a quantifier particle *daqanɨ* [daʁanɨ],[2] which is often shortened to *da* (henceforth *da(qanɨ)*). *Da(qanɨ)* has three main roles.[3]
• With WH-words and *biir* 'one', *da(qanɨ)* forms negative polarity items (NPIs):

(1) **NPIs**[4]

a. Min [tugu da(qanɨ)] aax-*(pa)-t-ɨm
1SG what.ACC *da* read-(NEG)-PST-1SG
'I didn't read anything'

b. Min [biir da kinige-(ni)] aax-*(pa)-t-ɨm
1SG one *da* book-(ACC) read-(NEG)-PST-1SG
'I didn't read any book(s)' / 'I read no book(s)'

• *Da(qanɨ)* also functions as a scalar focus particle with common nouns (2-a), non-low point quantifiers (2-b), and marks concessive clauses (2-c):

(2) **Scalar focus particle**

a. **Even** particle
[Onnooqor studjen da(qanɨ)] iti kinige-ni aax-(pa)-t-a
even student *da* that book-ACC read-(NEG)-PST-3SG
'Even the student (didn't) read that book'

b. **Intensifiers**, following non-low point quantifiers
[Elbex da kihi] kinige aax-(pa)-t-e
many *da* person book read-(NEG)-PST-3SG
(Positive): 'So many people read (the) book' (more people than the speaker expected)
(Negative) 'So few people read (the) book' (fewer people than the speaker expected)

c. **Concessive**
[Djulus$_i$ [miigin$_s$ sötüölee-bit-e$_s$] die-bit-e$_i$ da(qanɨ)] min onu baara
[Djulus [1SG.ACC swim-REM.PST-3SG] say-REM.PST-3SG *da*] 1SG that.ACC COP
kɨaj-an sötüölee-bep-pin
be.able-CVB swim-NEG.AOR-1SG
'Even though Djulus said I swam, I actually can't swim'

• Finally, *da(qanɨ)* appears in coordination constructions, where it appears to the right of each coordinand. In a positive environment, this means 'both...and' (3-a). In a negative environment, this means 'neither...nor' (3-b).

(3) ***Da(qanɨ)...da(qanɨ)* coordination**

a. Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-t-e
Ian coffee *da* tea *da* drink-PST-3SG
'Ian drank both coffee and tea' (coffee ∧ tea)

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[4]Abberviations used in glosses: 1, 2, 3, SG, PL first, second, third person (pronouns and agreement markers), singular and plural, ACC=accusative case, AOR=aorist, CMPR=comparative case, COP=copula, CVB=converb, DAT=dative, FUT=future, NEG=negation, PST=past, REM.PST=remote past.

b. Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-pe-t-e
Ian coffee *da* tea *da* drink-NEG-PST-3SG
'Ian drank neither coffee nor tea' ¬(coffee ∨ tea)

• This is a typologically interesting distribution–

(4) Assumptions
a. One standard view of NPIs is that they are existentials which obligatorily scope below negation (Fauconnier 1975; Ladusaw 1979; Chierchia 2013; Crnič 2014).
b. Existentially quantified propositions (∃x[A(x) ∧ B(x)]) are equivalent to disjunctions (p ∨ q) (Keenan and Faltz 1985; Keenan and Stavi 1986).
c. *Da(qanɨ)* in all of these environments is the same morpheme–this is not accidental homophony:
(i) Length: *Daqanɨ* is three syllables
(ii) Alternation: If *daqanɨ* is available, it can be optionally shortened to *da*.[5]

• A connection between NPIs built out of WH-words/indefinites or the numeral 'one' (1) and a particle which elsewhere means *even* (2) is found in many languages–e.g. Hindi *koii bhii* 'someone+even' *ek bhii* 'one+even' (Lahiri 1998). Called *even-some/even-one* NPIs by Chierchia (2013).
• While on its own, a construction like *da(qanɨ)...da(qanɨ)* coordination (3) which means 'and' in positive environments but 'or' under negation is not unheard of,[6] elements which serve this purpose AND build NPIs generally have a much wider distribution than Sakha *da(qanɨ)*–namely, that they can be used as additive particles (e.g. *X too*, *also X*, *X either*) and may even have universal readings outside of coordination. *Da(qanɨ)* doesn't seem to display additivity (and in fact, appears to be ANTI-ADDITIVE in NPIs)[7] and, outside of coordination, never displays a universal-like meaning.

1.1 Preview of analysis and road-map

• In §2, I will compare the distribution of *da(qanɨ)* to similar elements in other languages–namely Hungarian *is*, SerBo-Croat *i*, Hebrew *kol*, and Japanese *-mo*, as well as *da(qanɨ)*'s cognate in various other Turkic languages.

• Semantically, I will argue that the behavior of *da(qanɨ)* in all of these environments can be accounted for within the alternative-semantics based, GRAMMATICAL THEORY OF POLARITY SENSITIVITY (following Krifka 1995; Lahiri 1998; Fox 2007; Fox and Katzir 2011; Crnič 2011, 2014; Chierchia 2004, 2006, and especially Chierchia 2013).

• In §3, I provide a semantic account of *da(qanɨ)* NPIs (§3.1) and coordination structures (§3.2).

• It is argued that *da(qanɨ)* marks the alternatives of its host as obligatorily active–these alternatives are in turn interpreted by a covert operator, which accounts for the NPI behavior. Most radically, I argue that the 'both...and' coordination is underlyingly a disjunctive (*or*) meaning which is uniformly strengthened to *and* in positive environments.

• §4 is an appendix, providing additional data on the interaction of *da(qanɨ)* and differential object marking (§4.1), some generalizations about the distribution of full *daqanɨ* vs. reduced *da* (§4.2), additional licensing environments for *da(qanɨ)*-marked NPIs (§4.3), some additional discussion of *biir da* NPIs (§4.4), and a brief discussion of the semantics of *da(qanɨ)* as a scalar particle (§4.5).

2 Typology of *da(qanɨ)*

• There is an growing literature examining the patterns of quantifier particles which seeks to explain their semantics as stable across the environments they occur in, rather than treating the particle+host as an idiomatic expression (Szabolcsi and Haddican 2004; Szabolcsi 2010, 2015, 2017, 2018).

• The composition of a quantifier particle+host can reveal morphemic distinctions that may not be apparent in English-like languages. For example, the English NPI *ever* cannot be broken down into smaller sub-parts that are intelligible to a native speaker. But if a language has many NPIs with the same morpheme, it suggests that there is a stable semantic denotation underlying for each.

[5] But not vice versa. See §4.2 for a tentative description of the patterning of *da* vs. *daqanɨ*
[6] e.g. Modern Hebrew quantifier *kol* Bar-Lev and Margulis 2014; Japanese particle *-mo* (Kuroda 1965; Shimoyama 2006; Mitrović 2014); Warlpiri coordinator *manu* Bowler 2014)
[7] See Appendix §4.3.

• What is really interesting, and exciting for those who care about making cross-linguistic generalizations about morpho-semantics, is the additional particles that these elements can appear in, as it reflect semantic features that are not necessarily apparent in a single case.

2.1 How unusual is this distribution?

(5) Distribution of various quantifier particles in Sakha (fieldwork), Hungarian (Szabolcsi, see above citations), Serbian/Bosnian/Croatan (SerBo-Croat) (from Szabolcsi 2017; Progovac 1994; Mitrović and Sauerland 2014, 2016), Modern Hebrew (Bar-Lev and Margulis 2014; Glinert 1989; Tonciulescu 2011), and Japanese (Szabolcsi 2015; Kratzer and Shimoyama 2002; Shimoyama 2006, 2011). Grayed out cells indicate the presence of elements which overlap at least two of the following roles (i) NPIs, (ii) conjunction (p ∧ q), (iii) universal quantification

Category	English	Sakha	Hungarian	SerBo-Croat	Hebrew	Japanese
Quantifiers	who	kim	ki	(t)ko	mi	dare
	someone, ∃	kim ere, kim emie	vala-ki	ne-(t)ko	míshehu	dare-ka
	everyone, ∀	barɨ, xas biirdii kihi	mind-en-ki	sva-ko	**kul**-am	daré-**mo**
	every/all X	xas biirdii X (barɨ-tan)	mind-en		**kol** X	
	anyone, FCI	kim baqarar	akár-ki	bilo (t)ko	**kol**-exad	dare-de-**mo**
	any X, FCI				**kol** X	
	even X, FCI	X **da(qanɨ)**	még X **is** akár X **is**	(čak) **i** X (makar) **i** X		
	anyone, NPI	kim **da(qanɨ)**	vala-ki **is**	**i**-(t)ko	**kol**-exad	dare-**mo**
	nobody, NCI	*n/a*	**sen**-ki	**ni**-(t)ko	af exad	
	any X, NPI	biir **da** X			**kol** X	
Coordination	both X and Y	X **da(qanɨ)** Y **da(qanɨ)**	X **is** Y **is**,	**i** X **i** Y	gam X gam Y,	X-**mo** Y-**mo**
		emie **da** X emie **da** Y	mind X mind Y		hen X ve-hen Y	
	neither X nor Y	X **da(qanɨ)** Y **da(qanɨ)**	**sem** X **sem** Y	**ni** X **ni** Y	lo X ve-lo Y	
			X **sem** Y **sem**			
	either X or Y (not both)	X duu Y duu	vagy X vagy Y, akár X akár Y	**i**-li X **i**-li Y	o X o Y	X-ka Y(-ka)
Scalar particles	X too	X emie	X **is**	**i** X	gam X	X-**mo**
	even X	(onnooqor) X **da(qanɨ)**	még X **is**	(čak) **i** X	afilu X	X-**mo**
	X either	x emie	X **sem**	**ni** X		

• As we see from table (5), Hungarian *is* (negative concord *sem*) and SerBo-Croat *i* (negative concord

ni) pattern closely in quantifiers, coordination, and scalar particles , while Japanese *-mo* and Hebrew *kol* show significant overlap in their roles as quantifiers. Japanese *-mo* patterns closely to Hungarian *is/sem*, and SerBo-Croat *i/ni*, though I lack data for many of the functions. This overlap is simplified in (6):

(6) ✗ ='not available for this role', empty cells indicate lack of data

	Role	Sah *da(qanɨ)*	Hun. *is/sem*	SrBo-Cro *i/ni*	Heb *kol*	Jpn *-mo*
	everyone, ∀	✗	✗	✗	✓	✓
	every, all X ∀	✗	✗	✗	✓	
	anyone, FCI	✗	✗	✗	✓	✓
	even X, FCI	✓	✓	✓		
	anyone, NPI	✓	✓	✓	✓	✓
	nobody, NCI	*n/a*	✓	✓		
	any X, NPI	✓			✓	
	both X and Y	✓	✓	✓	✗	✓
	neither X nor Y	✓	✓	✓	✗	
☞	X too	✗	✓	✓	✗	✓
	even X	✓	✓	✓	✗	✓
☞	X either	✗	✓	✓		

• The most interesting difference between Sakha *da(qanɨ)* on the one hand and Hungarian *is/sem*, Serbo-Croat *i/ni* and Japanese *-mo* on the other is that *da(qanɨ)* lacks the additive particle roles *X too* and *X either*. Instead, Sakha uses *emie*.

(7) X too

a. Djulus kofje is-t-e. Min {emie / #da(qanɨ)} is-t-im
Djulus coffee drink-PST-3SG. 1SG {*emie* / *da*} drink-PST-1SG
'Djulus drank coffee. I also drank (coffee'

(8) X either

a. Djulus kofje is-pe-teq-e. Min {emie / #da(qanɨ)} is-pe-teq-im
Djulus coffee drink-NEG-REM.PST-3SG. 1SG {emie / *da*} drink-NEG-REM.PST-1SG
'Djulus didn't drink coffee. I didn't either/ I also didn't'

• Additive *too* and *either* are essentially presuppositions that some other proposition other than the focus value of *too*, *either* is true (Rullmann 2003). Additivity would be a convenient way to explain why Hungarian *is/sem*, SerBo-Croat *i/ni*, and Japanese *-mo* also appear in conjunction (*both X and Y*) roles. But, crucially, the fact that Sakha *da(qanɨ)* appears in these constructions as well suggests that it is not strictly required.[8]

• Note that *even X* also has an additive component (Crnič 2011). But in Sakha, *da(qanɨ)* cannot express an *even*-meaning without the aid of additional elements in positive environments:

(9) [??(onnooqor) studjen da(qanɨ)] iti kinige-ni aax-t-a
even/especially student *da* that book-ACC read-PST-3SG
'Even the student read that book'

• In other words, (9) suggests that *da(qanɨ)* can appear in the scope of an additive operator, but it does not express additivity on its own.

• Considering Japanese *-mo*, another possibility is that a *both...and* meaning and an NPI can be linked by universal quantification (or a universal free-choice meaing). In fact, it has been argued that Japanese WH+*mo* NPIs are actually universals which obligatorily scope over their licenser (Furukawa 2007; Shimoyama 2011). This is not a crazy assumption, given the DeMorgan's equivalence:

(10) $\neg\exists x P(x) \Leftrightarrow \forall x \neg P(x)$

• But a wide-scope universal account of Sakha *da(qanɨ)* predicts that WH+*da(qanɨ)* could express a universal meaning without negation. It cannot–as we saw in (1), it is simply ungrammatical.

• Further, WH+*da(qanɨ)* lacks free-choice readings. Instead, Sakha uses *baqarar* (a particle related to *baqar* 'to want'):

[8] When we investigate further the other licensing environments of *da(qanɨ)* (in Appendix §4.3), it turns out that *da(qanɨ)* NPIs are actually only licensed by ANTI-ADDITIVE functions (negation, comparatives) (Zwarts 1996).

(11) Behavior with modal:

a. Djulus [xanna {*da(qanɨ) / baqarar}] utuj-on söp
Djulus where {*da* / *baqarar*} sleep-CVB can
'Djulus can sleep anywhere'

• A note about *even X, FCI* in (5), (6)–this is distinct from a free-choice item like Japanese *WH-de-mo* or English *any* in that the free-choice reading is a product of an implicature, NOT the semantics of the particle *per se*:

(12) Even FCI

a. Hungarian *is* (Szabolcsi 2017 (16)
Akár Mari is {nyerhet / *nyer}
want Mari *is* {can.win / wins}
'Anyone can win; to pick an arbitrary example, Mari'

b. Sakha *da(qanɨ)*
iti kinige-ni {min da ehe-em / ehe-em da(qanɨ)} aaq-ɨan söp
that book-ACC {1SG *da* grandfather-1SG / grandfather-1SG *da*} read-FUT can
'Even my grandfather can read that book (to pick an arbitrary example)'

2.2 *Da(qanɨ)*'s cognate in other Turkic languages

• When we investigate *da(qanɨ)*'s cognate in other Turkic languages, as well as the lexical items associated with the other roles discussed above, we see some unsurprising patterns.

• The following are from Öztopçu et al. 1999:

(13) Oghuz

	Azerbaijani	Turkish	Turkmen
nobody	heç kəs	(hiç) kim-se	hiç kim-se
anybody	kim-sə, hər kəs	kim-se, her-kes	her kim
everybody	hər kəs	her-kes	her-kem
both...and	həm...həm	hem...hem	hem...hem
either...or	ya...ya [**da**]	ya...ya [**da**]	yä...yä [**-da**]
neither...nor	nə...nə [**də**]	ne...ne [**de**]	ne...ne [**-de**]
too	**da**, **də**	**da**, **de**	**da**, **de**, hem
also	**da**, **də**	**da**, **de**	**da**, **de**, hem

(14) Kipchak

	Tatar	Kazakh	Kyrgyz
nobody	hich-kim	yesh kim	ech kim
anybody	ken-der(?), här-kem	birew, är-kim	biröö, ar kem
everybody	här-kem	är-kim	ar kim
both...and	häm...häm	**da...da**	**da...da**
neither...nor	ni...ni	**de...de**	je...je
either...or	ya...ya	ne...ne	je...je
too	**da**, **dä**	**taghı da**	**da**
also	**da**, **dä**	**taghı da**	**dagı da**

(15) Karluk

	Uzbekh	Uyghur
nobody	hech kim	hech-kem
anybody	hamma, har kim	bir kim, biräv
everybody	har kim	här kim
both...and	ham...ham	häm...häm
neither...nor	na...na	nä...nä
either...or	yo...yo	ya[ki]...ya[ki]
too	ham	-mu
also	-mu	ham

• In these brief samplings from Oghuz-, Kipchak-, and Karluk-branch languages, we see a few patterns. Firstly, all three of these branches lack anything like *da(qanɨ)* in the quantifier domain–rather, they use the borrowed Persian morphemes *hiç* for NPIs, *har* for universals (Kelepir 1996; Erdal 2004; Szabolcsi 2018). *Ham* is also borrowed form Persian.

• In the Oghuz and Kipchak samplings, *da(qanɨ)*'s cognate is used as an additive particle (too, also). We also observe *neither...nor*/*both...and* flip in Kazakh (14).

• Obviously, these samplings are not representative: *da...da* can also mean *both...and* in Turkish, for example (16-a), as well as *neither...nor* (16-b):

(16) a. Hasan da Ali de Zeynep de dün sinema-ya gi-t-ler
Hasan *da* Ali *da* Zeynep *da* yesterday cinema-DAT go-PST-3PL
'Hasan and Ali and Zeynep went to the movie theater yesterday' (Kornfilt 1997, p.113)

b. Hasan da Ali de Zeynep de dün sinema-ya gi-me-ti-ler
Hasan *da* Ali *da* Zeynep *da* cinema-DAT go-NEG-PST-3PL
'Neither Hasan nor Ali nor Zeynep went to the movies yesterday'

• Tuvan is the only other Siberian Turkic language that I have been able to find any data on: in Tuvan, *da(qanɨ)*'s cognate *-daa* functions as an NPI (17) and as a universal quantifier (18) (Krueger 1977; Harrison and Anderson 2006).

(17) Tuvan WH+*daa* NPIs

a. kım-daa bil-be-s
who-*da* know-NEG-??
'No one knows that'

b. Men ony kažan-daa ut-pa-s men
1SG that when-*da* forget-NEG-?? 1SG
'I'll never forget that'

(18) Tuvan WH+*daa* universal quantifier/FCI

a. onu kım-daa bil-ir
that who-*da* know-AOR
'Everyone knows that'

b. kažan-daa nogaan çıdar ıyaštar
when-*da* green ?? ??
'trees which always retain green (evergreens)'

• Tuvan *-daa* is also indicated as meaning 'both...and' (Harrison and Anderson 2006), though I lack any examples for this.

• Tuvan *-daa* tentatively seems to pattern closer to Japanese *-mo*, though further investigation is needed.

3 Semantics of *da(qanɨ)*

• In the rest of this paper, I will argue that *da(qanɨ)*'s role in Sakha can be accounted for within the alternative-semantics theory of polarity sensitivity.

• First, I will explain how this theory accounts for NPIs §3.1, applying it to WH+*da(qanɨ)* NPIs in

Sakha.[9]

• In §3.2, I explore how this theory can extend and explain the distribution of *da(qanɨ)* in coordination structures.

3.1 NPIs

• It has long been noted that NPIs and scalar implicatures of existentials show significant overlap with regards to the direction of entailment that they appear within (Fauconnier 1975; Chierchia, Fox, and Spector 2012)–scalar implicatures arise in positive, upward entailing environments (19-a), where NPIs are ungrammatical. Scalar implicatures are cancelled in negative, downward entailing environments (19-b), where NPIs are grammatical.

(19) a. Positive, upward entailing
  (i) I read a page yesterday. (Scalar implicature= 'I read one page and no more')
  (ii) *I read any page yesterday.
 b. Negative, downward entailing
  (i) I didn't read a page yesterday. (no scalar implicature)
  (ii) I didn't read any page(s) yesterday.

• Scalar implicatures arise in positive, upward entailing environments because there is a stronger alternative which, crucially, the speaker does not use–because the stronger alternative is not used, we pragmatically reason that the stronger alternative is false. BUT, ordinary scalar implicatures can be cancelled (e.g. *I read a page yesterday...in fact I read 4 pages.*)

• The GRAMMATICAL THEORY OF POLARITY SENSITIVITY (Chierchia 2013) pushes the link between scalar implicatures and NPIs to its logical extreme:

(20) Link between ordinary scalars and polarity-sensitive items (PSIs) (quoted parts from Chierchia 2013, p.186)
 a. Both ordinary scalar elements and PSI have scalar alternatives.
  (i) "Alternatives generated by ordinary scalars are subject to relevance and can be pruned" (Where *pruning* means ignored, broadly defined)
  (ii) "Alternative generated by PSIs like *any* are not subject to relevance. They cannot be pruned." In other words, the alternatives generated by PSIs are grammatically defined parts (hence the name GRAMMATICAL THEORY).
 b. "Alternatives cannot be activated idly. If they are active, non-entailed ones must be eliminated"

(21) NPIs... (Crnič 2014 p.189–190)
 a. "Denote existential quantifiers"
 b. "Induce alternatives, similarly to focused elements"
 c. "The alternatives they induce are utilized by specific alternative-sensitive operators"

• In the rest of this subsection, I will demonstrate this approach with regards to WH+*da(qanɨ)* NPIs. *Biir da* NPIs require further assumptions and are explored in Appendix §4.4.

(22) Min kimi da(qanɨ) kör-*(bö)-t-üm
 1SG who.ACC *da* see-(NEG)-PST-1SG
 'I didn't see anybody'

• The starting point for a denotation of (22) is the definition of *kim*. As a WH-indefinite, *kim* is an existential quantifier (23-a):[10]

(23) a. $[\![\text{kim}]\!] = [\![\text{someone}]\!] = \lambda P_{\langle e,t\rangle}.\exists x \in D_e[\text{person}(x) \wedge P(x)]$
 b. $[\![(22)]\!] = \exists x \in D_e[\text{person}(x) \wedge \text{see}(I, x)]$

• Without negation and *da(qanɨ)*, (22) will have a meaning like (23-b).

[9] Because of the nature of numerals like *biir* 'one', *biir da* NPIs require some additional assumptions that are not worth spelling out for the purposes of this talk. See §4.4 for a brief discussion.

[10] This is one standard assumption made about the semantics of WH-terms, though not the only. It is generally assumed in this theory, so I will not take time to explore other options.

• Considering a domain with two members {Djulus,Tujara}, (23-b) is equivalent to a disjunction of two propositions:

(24) (p ∨ q), where p='I saw Djulus', q='I saw Tujara'.

• In (22), the semantic roleof *da(qanɨ)* is that it marks the alternatives of *kimi* as obligatorily active:

(25) $[\![(22)]\!] = x_e[\text{person}(x) \wedge \text{see}(I, x)]_{[+\text{ALT}]}$

• There are two types of alternatives for a disjunction (p ∨ q): (i) the subdomain alternatives, which are the individual disjuncts {p,q} (Sauerland 2004), and (ii) the stronger scalar alternatives, which is a conjunction (p ∧ q). Existentials have a natural Horn (1989) scale ($< \exists, \forall >$, i.e. $< \vee, \wedge >$). This alternative set can be represented by a semi-lattice like (26):

(26) Alternatives set of (p ∨ q)

	(p ∨ q)	Prejacent
p	q	D-alts (subdomain alternatives)
	(p ∧ q)	σ – Alt (scalar alternatives)

• The alternatives are grammatically defined (i.e. they are part of the meaning of the polarity sensitive elements), so unlike regular scalar elements, they cannot be ignored. In other words, when a proposition like *min kimi da(qanɨ) kör-t-üm* reaches LF, its alternatives are marked to be interpreted by an alternative-sensitive operator.

• These alternative-sensitive operators are also known as EXHAUSTIFIERS. An exhaustifier performs some pre-defined actions on the alternatives of the prejacent.

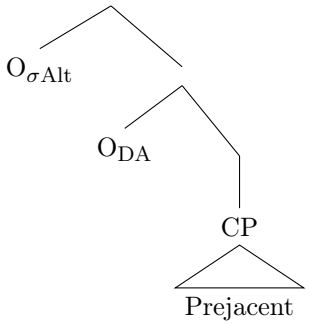
• The most basic exhaustifier is O, which is a covert counterpart to *only* (Karttunen and Peters 1979; Rooth 1985, 1992; Krifka 1995; Chierchia, Fox, and Spector 2012):

(27) $O_{\text{ALT}}(\phi) = \phi \wedge \forall\psi \in \text{ALT}[\psi \rightarrow \phi \subseteq \psi]$, where '⊆' means 'entails' (Chierchia 2013)

a. $O(\phi)$ asserts ϕ and eliminates (i.e. negates) all of the alternatives which are not entailed by ϕ.

• Chierchia's (2013) system splits the exhaustification of the subdomain and scalar alternatives as two separate steps (28):[11]

(28) Split exhaustification



• Exhaustification of the positive version of (22) is shown in (29):

(29) a. $O_{\sigma\text{Alt}}(O_{\text{DA}}(p \vee q)) =$

b. $O_{\text{DA}}(p \vee q) = (p \vee q) \wedge \underbrace{\neg p \wedge \neg q}_{\neg(p \vee q)}$ (DeMorgan's law)

$(p \vee q) \wedge \neg(p \vee q)$ is a contradiction!

• In (29-a), O_{DA} excludes the subdomain alternatives of (p ∨ q) which are not entailed–i.e. it negates

[11] The significance of this will become clearer in the next subsection, where it is argued that there is no scalar alternative to exhaustify for *da(qanɨ)...da(qanɨ)* coordination. Note that we DO need a scalar alternative for NPIs, because only exhaustifying the domain alternatives would predict a salvageable meaning with a modal: $O_{\text{DA}}(\Diamond(p \vee q)) = \Diamond(p \vee q) \wedge \neg\Diamond p \wedge q \equiv \Diamond(p \vee q) \wedge \Diamond\neg(p \vee q)$. The exhaustified scalar alternative $\neg\Diamond(p \wedge q)$ contradicts this.

them.[12]

• This results in a contradiction, because the negated subdomain alternatives (29-b) are equivalent to a negation of the prejacent! This contradiction is the source of ungrammaticality in Chierchia's (2013) theory of NPIs in positive environments. Because the alternatives are grammatically defined, we cannot pragmatically eliminate this contradiction.

• In other words, (30) is ungrammatical because it is is a contradiction.

(30) *Min kimi da(qanɨ) kör-t-üm
1SG who.ACC *da* see-PST-1SG
'*I saw anybody'

• When the prejacent is negated, O_{DA} does not result in a contradiction. Negation scopes over the alternatives as well (31):

(31)

	$\neg(p \vee q)$		Prejacent
$\neg p$		$\neg q$	D-Alts
	$\neg(p \wedge q)$		σ – Alt

• In (31), all of the alternatives are entailed by the prejacent, so O(nly) cannot negate them. Hence, exhaustifying them will simply return the prejacent and all of the alternatives it entails:

(32) a. $O_{\sigma-Alt(O_{DA}(\neg(p \vee q)))} = \neg(p \vee q)$
b. Entailed alternatives of $\neg(p \vee q) = \{\neg p, \neg q, \neg(p \wedge q)\}$
c. $O_{ALT}(\neg(p \vee q)) = \neg(p \vee q) \wedge \neg p \wedge \neg q \wedge \neg(p \wedge q)$

• This explains the grammaticality of NPIs in negative environments:

(33) Min kimi da(qanɨ) kör-bö-t-üm
1SG who.ACC *da* see-NEG-PST-1SG
'I didn't see anyone'

3.2 Coordination

• How can exhaustification explain *da(qanɨ)*'s meaning in coordination structures? Recall that in positive environments, *da(qanɨ)...da(qanɨ)* means 'both...and' (34-a), but in negative environments, it means 'neither...nor' (34-b).

(34) a. Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-t-e
Ian coffee *da* tea *da* drink-PST-3SG
'Ian drank both coffee and tea'
b. Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-pe-t-e
Ian coffee *da* tea *da* drink-NEG-PST-3SG
'Ian drank neither coffee nor tea'

• Given the presence of *da(qanɨ)* in NPIs §3.1, as well as the 'neither...nor' reading in (34-b), it would seem to follow that we are dealing with a disjunction here as well.

• Further evidence that this is the same morpheme here as in the NPI cases comes from coordinated NPIs: two *da(qanɨ)*-marked NPIs can be coordinated under negation (35-a), but an additional *da(qanɨ)* in the coordinands is not acceptable (35-b), nor is the addition of a conjunction like *uonna* (35-c):

(35) a. Min [kimi da(qanɨ)] [tugu da(qanɨ)] kör-*(bö)-t-üm
1SG who.ACC *da* what.ACC *da* see-(NEG)-PST-1SG
'I saw neither anybody nor anything'
b. *Min [kimi da(qanɨ) da(qanɨ)] [tugu da(qanɨ) da(qanɨ)] kör-bö-t-üm
c. *Min [kimi da(qanɨ] uonna [tugu da(qanɨ)] kör-bö-t-üm (*uonna*='and')

• But how in the world can we explain the conjunctive meaning in (34-a), then?!

• The solution comes in the form of two differences from the semantic proposal for NPIs §3.1. While maintaining that *da(qanɨ)* in coordination still marks the alternatives of the host as obligatorily active,

[12] For the curious reader, continuing to exhaustify the scalar alternative cannot save the derivation in (29), because it will not undo the contradicion (i.e. $O_{\sigma Alt}(p \vee q) = (p \vee q) \wedge \neg(p \wedge q)$).

the nature of the alternatives differs when *da(qanɨ)* marks elements that do not have natural scalar alternatives (recall that WH-words have a natural Horn scale $< \exists, \forall >$).

• First, it is significant that in ***da(qanɨ)…da(qanɨ)* coordination (34), there are two (or more) elements which have been marked as obligatorily alternative-sensitive, unlike with *da(qanɨ)*-marked NPIs.** It would follow that we have to exhaustify EACH of these alternatives.

• O(nly) exhaustification can be applied recursively, where not only the alternatives of the prejacent are exhaustified, but also the alternatives of the alternatives are exhaustified. This has been utilized to explain free-choice disjunction (Fox 2007), as well as free-choice items in general (Chierchia 2013).

(36) Exhaustification of subdomain alternatives:

	$(p \vee q)$		Prejacent
$O(p)$		$O(q)$	D-Alts
	$(p \wedge q)$		σ – Alt

$\Rightarrow$

	$(p \vee q)$		Prejacent
$(p \wedge \neg q)$		$(q \wedge \neg p)$	D-Alts
	$(p \wedge q)$		σ – Alt

• (36) shows a typical alternative set, with the subdomains exhaustified (this is also known by Chierchia's (2013) term "pre-exhaustfication"). But, notice something crucial about the host of *da(qanɨ)* in coordination structure:

(37) (Vinokurova 2005, p.202)

a. Ookko [tust-ar da] [saxɨmatɨɨ-r da]
Ookko [wrestle-AOR *da*] [play.chess-AOR *da*]
'Ookko both wrestles and plays chess' Verb-Verb

b. Ookko [küüsteex da] [sɨmsa da]
Ookko [strong *da*] [quick *da*]
'Ookoo is both strong and fast' Adjective-Adjective

c. Ookko [bulčut da] [sirdjit da]
Ookko [hunter *da*] [guide *da*]
'Ooko is both a hunter and a guide' Noun-Noun

• The (37), the coordinated elements have no inherent quantificational force–they are properties/sets. It therefore makes very little sense to consider a scalar alternative for these types of elements.

• **Claim: the elements coordinated by *da(qanɨ)…da(qanɨ)* have no scalar alternatives.**

• Recursive exhaustification with O(nly) in the absence of a stronger scalar alternative results in a disjunction being strengthened to a conjunction:

(38) a. $O_{\text{Exh–DA}}(p \vee q) = (p \vee q) \wedge \underbrace{\neg O(p)}_{\underbrace{\neg(p \wedge \neg q)}_{(p \to q)}} \wedge \underbrace{\neg O(q)}_{\underbrace{\neg(q \wedge \neg p)}_{(q \to p)}}$ [13]

b. $= \underbrace{(p \vee q) \wedge \underbrace{(p \to q) \wedge (q \to p)}_{(p \leftrightarrow q)}}_{(p \vee q) \wedge (p \leftrightarrow q)}$

• The equivalence of (38-b) to *and* is shown in (39):

(39)

p	q	$(p \vee q)$	$(p \leftrightarrow q)$	$(p \vee q) \wedge (p \leftrightarrow q)$
T	T	T	T	T
T	F	T	F	F
F	T	T	F	F
F	F	F	T	F

• If we were to carry on and exhaustify the scalar alternative, we would reach a contradiction:

(40) $O_{\sigma\text{Alt}}(O_{\text{Exh–DA}}(p \vee q)) = (p \wedge q) \wedge \neg(p \wedge q)$

• This mechanism has been utilized to explain elements which have a conjunctive/universal meaning in positive environments, but a narrow-scope disjunction/existential reading with negation, such as Child-English *or* (Singh et al. 2016), Malay *pun* (Wong 2017), Hebrew *kol* (Bar-Lev and Margulis 2014), and

[13] Material implication: $\neg(\phi \wedge \neg\psi) \Leftrightarrow (\phi \to \psi)$

Warlpiri *manu* (Bowler 2014).[14]

• The justification for not exhaustifying a scalar alternative is typically that the language at hand does not have an element within the same class as the alternative-sensitive element which is a stronger scale mate–For example, for Warlpiri *manu*, there is simply no additional word for 'and' (Bowler 2014).[15]

• Rather than relying on the lack of a competing *and*-word, my analysis relies on the lack of a stronger alternative to each individual disjunct.

• **To summarize:** A sentence like (41) is underlyingly a disjunction (41-a). *Da(qanɨ)* marks the alternatives of the host as obligatorily active, which results in (41-a-i) being the domain alternative of (41-a) (this is the "pre-exhaustified" alternative). We exhaustify (41-a) with respect to the set in (41-a-i), which results in (41-b)

(41) Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-t-e
'Ian drank both coffee and tea'

a. 'Ian drank coffee' ∨ 'Ian drank tea'
   (i) ALTs((41-a))={'Ian drank coffee and not tea', 'Ian drank tea and not coffee'}
   (ii) i.e. 'Ian drank not only coffee and Ian drank not only tea'

b. 'Ian drank coffee or Ian drank tea' ∧ ¬('Ian drank coffee and not tea')∧¬('Ian drank tea and not coffee')
   ='Ian drank coffee or tea' ∧ 'if coffee, then tea' ∧'if tea, then coffee'
   ='Ian drank coffee or tea' ∧'Ian drank coffee if and only if Ian drank tea'
   Therefore, 'Ian drank coffee and tea'.

3.2.1 Extension to *neither…nor* reading of *da(qanɨ)…da(qanɨ)*

• Recursive exhaustification poses no threat in the presence of negation:

(42) $O_{Exh-DA}(\neg(p \vee q)) = \neg(p \vee q) \wedge \underbrace{\neg O(\neg p)}_{\neg(\neg p \wedge \neg\neg q) \equiv \underbrace{\neg(\neg p \wedge q)}_{(q \to p)}} \wedge \underbrace{\neg O(\neg q)}_{\neg(\neg q \wedge \neg\neg p) \equiv \underbrace{\neg(\neg q \wedge p)}_{(pq)}}$

$\underbrace{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}_{\neg(p \vee q) \wedge (p \leftrightarrow q)}$

• The result of (42) is equivalent to ¬(p ∨ q):

(43)

p	q	¬(p ∨ q)	(p ↔ q)	¬(p ∨ q) ∧ (p ↔ q)
T	T	F	T	F
T	F	F	F	F
F	T	F	F	F
F	F	T	T	T

4 Appendix 1: Additional Observations and analysis

4.1 An interesting pattern: *da(qanɨ)* and DOM

• Sakha is a differential object marking (DOM), with non-marked objects receiving a masslike (or referential, depending on the context) reading (44-a), and accusative marked objects receiving a specific interpretation (44-b):

(44) a. kini kulaxɨ sje-t-e
3SG bedbug eat-PST-3SG
'S/he ate bedbug' (non-specific)

b. Kini kulaxɨ-nɨ sje-t-e
3SG bedbug-ACC eat-PST-3SG
'S/he ate that bedbug' (specific)

[14] It is also explored by Chierchia as a way to account for the universal reading of English free-choice *any* (2013, p.311), though he ultimately rejects it for this case because it would not prevent *any* from being grammatical without a modal.

[15] Sakha has a coordinator *uonna* which is typically translated as 'and', though it carries a meaning like 'in spite of' (Vinokurova 2005, p.202). Regardless, *da(qanɨ)* is not, in itself a coordinator–it is a focus particle which occurs with asyndetic conjunction.

• Under negation, bare objects mirror the behavior of positive environments (44), with non-marked objects receiving an indefinite reading (45-a) and accusative-marked objects receiving a specific interpretation (45-b):

(45) a. kini kulaxɨ sje-be-t-e
3SG bedbug eat-NEG-PST-3SG
(i) **Non-specific**: 'S/he didn't eat (any) bedbugs'
(ii) **Specific:** #'S/he didn't eat (that) bedbug'
b. kini kulaxɨ-nɨ sje-be-t-e
3SG bedbug-ACC eat-NEG-PST-3SG
(i) **Non-specific**# 'S/he didn't eat (any) bedbugs'
(ii) **Specific:** 'S/he didn't eat (that) bedbug'

• Oddly, DOM results in no difference when the object is quantified with *biir* in a positive sentence (46):

(46) Kini biir kulaxɨ-(nɨ) sje-t-e
3SG one bedbug-(ACC) eat-PST-3SG
'S/he ate one bedbug'

• Even more oddly, with *biir* objects under negation, DOM again creates a semantic distinction, with accusative again reflecting a specific interpretation (akin to a wide-scope reading of *one* with respect to negation):

(47) a. Kini biir kulaxɨ sje-be-t-e
3SG one bedbug eat-NEG-PST-3SG
(i) **Non-specific:**'S/he didn't eat one/any bedbug(s)
(ii) **Specific**: #'S/he didn't eat one (particular) bedbug'
b. Kini biir kulaxɨ-nɨ sje-be-t-e
3SG one bedbug-ACC eat-NEG-PST-3SG
(i) **Non-specific**: #'S/he didn't eat one/any bedbug(s)
(ii) **Specific**: 'S/he didn't eat one (particular) bedbug'

• And strangest of all, with *biir da* NPIs, this distinction disappears:

(48) Min biir da kinige-(ni) aax-pa-t-ɨm
1SG one *da* book-(ACC) read-ACC-NEG-PST-1SG
'I didn't read a/any book'

(49) Summary of DOM

Type of object	Polarity	DOM difference?
bare noun	pos	y
"	neg	y
biir+noun	pos	n
"	neg	y
biir da+noun	pos	*
"	neg	n

4.2 *Daqanɨ* vs. *da*

• The alternation between *daqanɨ* and *da* has been noted since the earliest descriptions of Sakh (Böhtlingk 1964 [1851]), though he expresses confusion about what governs the distribution.
• Native speakers are aware that they are the same word/morpheme/meaning.
• Generally, where *daqanɨ* is acceptable *da* is also acceptable.
• If *da(qanɨ)* appears to the right of a quantifier in a larger NP (i.e. [QUANT+da(qanɨ)+Noun]), *da* is preferred if the word to the left is two or fewer syllables:

(50) a. One syllable:
(i) ✓ biir da N, min da N
(ii) ?? biir daqanɨ N, min daqanɨ N
b. Two syllables:
(i) ✓ araas da N, elbex da N (*araas*='various', *elbex*='some, many')

(ii) ?? araas daqanɨ N, elbex daqanɨ N

c. Three syllables:
(i) ✓ aqɨjax da N (*aqɨjax*='few')
(ii) ✓ aqɨjax daqanɨ N

• In coordination constructions, my consultant indicated preference for at least one of *da(qanɨ)*s to be reduced:

(51) min kinige {da/daqanɨ} aax-t-ɨm suruk {da/daqanɨ} suruj-d-um
1SG book *da* read-PST-1SG letter *da* write-PST-1SG
'(I was so productive) I both read a book and also write a letter'

a. ✓ ... *da* ... *da* ...
b. ?? ... *daqanɨ* ... *daqanɨ* ...
c. ✓ ... *daqanɨ* ... *da* ...
d. ?? ... *da* ... *daqanɨ* ...

(52) iisus kini-ni ütüördübütüter kihi kör-ör {da/daqanɨ} saŋ-ar {da/daqanɨ}
Jesus 3SG-ACC healed person see-AOR *da* speak-AOR *da*
buol-but-a
be-REM.PST-3SG
'Jesus healed the man, so that he could both see and speak' [Matthew 12:22]

a. ✓ ... *da* ... *da* ...
b. ?? ... *daqanɨ* ... *daqanɨ* ...
c. ✓ ... *daqanɨ* ... *da* ...
d. ✓ ... *da* ... *daqanɨ* ...

• On the other hand, in the answer to a disjunctive question, the consultant had a slight preference for *daqanɨ* in both conjunts:

(53) a. **Question:** Does Ian drink coffee or tea?
b. **Answer:** Ian kofje-(nɨ) {da/daqanɨ} čaj-(ɨ) {da/daqanɨ} is-pit-e
Ian coffee-(ACC) *da* tea-(ACC) drink-REM.PST-3SG
'Ian drank both coffee and tea'
(i) ✓ ... *da* ... *da* ...
(ii) 👍 ... *daqanɨ* ... *daqanɨ* ...
(iii) ✓ ... *daqanɨ* ... *da* ...
(iv) ?? ... *da* ... *daqanɨ* ...

• While (53-b) would suggest a pragmatic contrast between the two forms, my consultant found little-to-no pragmatic contrast between *da* and *daqanɨ* in WH+*da(qanɨ)* NPIs, indicating that if one really wants to emphasize the NPI, either *da* or *daqanɨ* can receive pitch accent.

(54) Min tugu {✓da / ✓daqanɨ} aax-pa-t-ɨm
1SG what.ACC *da* read-NEG-PST-1SG
'I didn't read anything'

4.3 Other licensers of *da(qanɨ)* NPIs

• Aside from the direct scope of the clause-mate verbal negation suffix *-BA* (55) *biir da* and WH+*da(qanɨ)* NPIs are licensed by the negative copular *suox* (56), the prohibitive suffix *-IMa* (57), the negative converb *-BAkka*, and the the verb *ilik* 'not yet' (59)

(55) **Negative suffix *-BA***

a. {Kim da(qanɨ) / biir da studjen} iti kinige-ni aax-*(pa)-tax
{who *da* / one *da* student} that book-ACC read-(NEG)-REM.PST.3SG
'Nobody / no student read that book'

(56) **Negative copula *suox***

a. [[[Tuox da(qanɨ)] sɨala {suox / *baar}] suruj-but-um]
what *da* purpose NEG.COP / COP write-REM.PST-1SG
'I wrote for no reason' / 'I didn't write for any reason'

(57) **Prohibitive *-IMa***

a. {Tugu da(qanɨ) / biir da kinige-(ni)} aaq-*(ɨma)
{what.ACC *da* / one *da* book-(ACC)} read-(NEG.IMP)
'Don't read anything' / 'Don't read any book(s)'

(58) **Negative converb *-BAkka***

a. {Tugu da(qanɨ) / biir da kinige-(ni)} aax-pakka ereeri üören-n-im
{what.ACC *da* / one *da* book-(ACC)} read-NEG.CVB even.though study-PST-1SG
'I studied without read anything (any book)' / 'Even though I didn't read anything (any book), I studied'

(59) **Verb *ilik* 'not yet'**

a. Kim da(qanɨ) biir da kinige-(ni) aax-a ilik
who *da* one *da* book-ACC read-CVB not.yet.3SG
'Nobody has read any book yet'

• Each of these additional negative licensers can be characterized along the same lines as *-BA*, so we need not discuss them here.

• *Da(qanɨ)*-NPIs are not grammatical in NEG-raising constructions

(60) *Djulus [tugu da(qanɨ) is-pip-pin dien] bil-bet
Djulus [what.ACC *da* drink-REM.PST-1SG say.COMP] know-NEG.AOR
intended: 'Djulus doesn't know that he drank anything'

• It is unclear why *da(qanɨ)*-marked NPIs embedded in finite clauses are not able to be licensed by matrix negation. One possibility is that in examples like (60), the presence of the complementizer *dien*, transparently related to *die* 'say' creates a quote-like environment, so (60) may be ungrammatical for a similar reason that English **Djulus never said said "I ate anything"* is.[16]

• The only other licenser of *da(qanɨ)*-marked NPIs that I have found are standards of comparison (61-a). Here, *da(qanɨ)..da(qanɨ)* coordination also has a conjunctive reading if there are multiple standards of comparison

(61) Standard of comparison

a. Tujara [kim-neeqer da(qanɨ) uhun]
Tujara who-CMPR *da* tall
'Tujara is taller than anywhere'

b. Boston Jakutskai-daaqar tɨallaq da(qanɨ) sɨlas da(qanɨ)
Boston Yakutsk-CMPR windy *da* warm *da*
'Boston is winder and warmer than Yakutsk'

• Many analyses of standard comparisons like (61) include a covert degree negation in the comparative clause (Gajewski 2008). So while negation is not overt in examples like this, we can explain it as another case of licensing via negation.

• *Da(qanɨ)*-marked NPIs are NOT licensed in the antecedent of a conditional (62), nor in polar questions (63). Rather, there are other quantifiers particles *ere* and *emie* which serve this role (Haspelmath 1997).

(62) [Tujara [tugu {*da(qanɨ) / emit}] oŋor-doq-una] Djulus čaj kut-an bjer-iexteex
Tujara what *da* / *emit* repair-COND-3SG Djulus tea pour-CVB serve-FUT
'If Tujara repairs anything, Djulus will serve tea'

(63) [Kim {*da(qanɨ) / emit / ere}] kofje ih-er=ɨj?
Who *da* / *emit* / *ere* coffee drink-AOR=Q
(*kim emit*) 'Does someone drink coffee?' (*kim ere*) 'Does anyone drink coffee?'

• This patterning of licensing environments makes *da(qanɨ)*-marked NPIs strict/strong NPIs (Zwarts

[16] A note about the shifted reading in (60) and NPIs: Embedded clauses with a *die*-complementizer where the matrix and embedded subject are co-indexed obligatorily shift agreement from 3rd, 2nd to first, though overt logophoric pronouns (*min* 1SG, *bihigi* 1PL) cannot be coindexed with the matrix subject. This is a characteristic of the *pro*-dropped subjects being indexiphoric (Deal 2018, 2019), rather than true indexical shift (as has been argued for Uyghur (Sudo 2012; Shklovsky and Sudo 2014) and some dialects of Turkish (Akkuş 2018)). True indexical shift is known to allow matrix negation to license embedded NPIs (in fact, this is one of the main diagnostics of indexical shift), though indexiphors have not been examined closely with regards to this diagnostic.

1996). Strict NPIs require a licenser to be not just simply downward entailing, but Strawson downward entailing (i.e. downward entailing in not just regular, but also the implicatures) as well as anti-additive (Gajewski 2011).

(64) ANTI ADDITIVITY: A function f is ANTI-ADDITIVE iff $f(A \vee B) = f(A) \wedge F(B)$.

4.4 *Biir da* NPIs: some refinements

(65) Min biir da kinige-(ni) aax-*(pa)-t-ɨm
1SG one *da* book-(ACC) read-(NEG)-PST-1SG
'I didn't read any book'

• Because *biir da* NPIs involve numeral semantics, they do not easily lend themselves to an analysis via O(nly).

• The scale associated with numerals is richly defined: each subsequent number entails all the numbers lower than it:

(66) Scale of numerals: {one ⊇ two ⊇ three ⊇ ...}

• A numeral like *biir* can be defined as a cardinality prediate:

(67) a. $[\![\text{biir}]\!] = \lambda P_{\langle e,t\rangle}.\lambda Q_{\langle e,t\rangle}.\exists x[\text{one}(x) \wedge P(x) \wedge Q(x)]$
b. $[\![\text{biir da kinige}]\!] = \lambda Q_{\langle e,t\rangle}.\exists x[\text{one}(x) \wedge \text{book}(x) \wedge Q(x)]_{[+\text{ALT}]}$

• In *biir da+NP*, *da* marks the alternatives of *biir* as obligatorily active.

• Because the scale of numerals is richly defined, the domain alternatives of numerals are not really important: one(x)∨one(x) entails one(x). So we are only dealing with the scalar alternative. While O(nly) with negation works to a degree, it predicts strange readings:

(68) $O_{\sigma\text{Alt}}$ exhaustification of (65) in a negative environment
a. ALT(¬*biir da*)={¬one ⊆ ¬two ⊆ ¬three, ...}
b. $O_{\sigma\text{alt}}(\neg\text{biir da}) = O_{\sigma\text{Alt}}(\neg\text{one}) = \neg\text{one} \wedge \neg\text{two} \wedge \neg\text{three} \wedge ...$

• This does not rule out infelicitous readings of ¬*biir da*: for example, it is compatible with readings like *I didn't read [biir da book]* to mean he didn't read exactly two books–because the scalar implicature is grammatically active, it is not subject to relevance, so this cannot be ruled out by pragmatics alone. In essence $O_{\sigma\text{Alt}}$ fails to capture that there is something special about *biir* being the low endpoint of the scale of numerals.

• There is another exhaustifier which handles scales which are richly defined (as well as scales ordered by a probability metric): E, which is a covert counterpart to *even* (Crnič 2011, 2014; Chierchia 2013):

(69) $E_{\text{ALT}}(\phi) = \phi \wedge \forall\psi \in \text{ALT}[\phi <_\mu \psi]$
where '$\phi <_\mu \psi$' says 'ϕ is less likely than ψ with respect to some contextually relevant probabilyt metric

• The choice between O and E is not arbitrary: Chierchia (2013) proposes a grammatical principle OPTIMAL FIT:

(70) OPTIMAL FIT (Chierchia 2013, p.153)
In exhaustifying ϕ, use O unless $O(\phi)$ is trivial (=contradictory or vacuous) and there is a salient probability measure μ. A probability measure μ is salient iff one of the following holds:
a. μ is salient in the context
b. **ALT is totally ordered by** ⊆

• E-exhaustificaiton is only satisfied if the alternative under consideration is the least likely of all of its alternatives. Because *biir* 'one' is the low-point on the scale of numerals, this will be satisfied by it, but no other numerals. Further, it will only be defined under negation (as otherwise, it is entailed by all of its alternatives, and hence cannot be less likely than them).

4.5 Scalar particle *da(qanɨ)* semantics

• The use of *da(qanɨ)* as a scalar particle involves emphasis and probability.

(71) **Scalar focus particle**

a. **Even** particle

[Onnooqor studjen da(qanɨ)] iti kinige-ni aax-(pa)-t-a
even student *da* that book-ACC read-(NEG)-PST-3SG

'Even the student (didn't) read that book'

b. **Intensifiers**, following non-low point quantifiers

[Elbex da kihi] kinige aax-(pa)-t-e
many *da* person book read-(NEG)-PST-3SG

(Positive): 'So many people read (the) book' (more people than the speaker expected)
(Negative) 'So few people read (the) book' (fewer people than the speaker expected)

c. **Concessive**

[Djulus$_i$ [miigin$_s$ sötüölee-bit-e$_s$] die-bit-e$_i$ da(qanɨ)] min onu baara
[Djulus [1SG.ACC swim-REM.PST-3SG] say-REM.PST-3SG *da*] 1SG that.ACC COP
kɨaj-an sötüölee-bep-pin
be.able-CVB swim-NEG.AOR-1SG

'Even though Djulus said I swam, I actually can't swim'

• E-exhaustification (introduced in §(65)) is necessary to explain the emphatic character of examples like (71). Unlike *da(qanɨ)* in NPIs §3.1 and coordination 3.2, here the alternatives of *da(qanɨ)* are anchored upon the speakers expectations:

(72) OPTIMAL FIT (Chierchia 2013, p.153)
In exhaustifying ϕ, use O unless O(ϕ) is trivial (=contradictory or vacuous) and there is a salient probability measure μ. A probability measure μ is salient iff one of the following holds:

a. **μ is salient in the context**
b. ALT is totally ordered by $\subseteq$

• Because the probability of the alternatives of scalar *da(qanɨ)* are contingent upon the speaker's expectations, the probability of the alternatives can be ranked in many ways–hence here *da(qanɨ)* is not restricted to negation.

• One rather interesting aspect of the scalar focus uses of *da(qanɨ)* is the relationship between *da(qanɨ)..da(qanɨ)* coordination and the concessive uses of *da(qanɨ)*. *Prima facie*, concessive uses (73-a) look like *da(qanɨ)...da(qanɨ)* coordination (74) minus the second *da(qanɨ)*. Further, in environments where it is pragmatically unlikely that both coordinands would obtain, *da(qanɨ)..da(qanɨ)* coordination is infelicitious (73-b).

(73) a. kini [iliite ɨraas da(qanɨ)] [sireje kirdeex]
3SG hand clean *da* face dirty
'Even though his hands are clean, his face is dirty'

b. #kini [iliite ɨraas da(qanɨ)] [sireje kirdeex da(qanɨ)]
3SG hand clean *da* face dirty *da*
'He has both clean hands and a dirty face'

(74) Ian [kofje da(qanɨ)] [čaj da(qanɨ)] is-(pe)-t-e
Ian coffee *da* tea *da* drink-(NEG)-PST-3SG
(pos): 'Ian drank both coffee and tea' (neg) 'Ian drank neither coffee nor tea'

• One possibility is that concessive *da(qanɨ)* involves exhaustificaiton of only the coordinand which is marked with *da(qanɨ)*

(75) where p='he has clean hands', q='he has a dirty face'

	(p ∨ q)		Prejacent
O(p)		q	D-Alts

• If we exhaustify (p ∨ q) with respect to the alternative set in (75), we get the following:

(76) $O(p \vee q) = \underbrace{(p \vee q) \wedge \underbrace{\neg(p \wedge \neg q)}_{(p \rightarrow q)} \wedge \neg q}_{(p \vee q) \wedge (p \rightarrow q) \wedge \neg q}$

a. From $(p \rightarrow q)$ and $\neg q$, we can conclude $\neg p$ (Modus Tolens). Thus, this is equivalent to $(p \vee q) \wedge \neg p \wedge \neg q \equiv (p \vee q) \wedge \neg(p \vee q)$ (DeMorgan's).

• The meaning in (76-a) seems to be close to what the speaker's expectations are in a concessive clauses: We expect that if you have clean hands, you have a clean face. If it turns out you have a dirty face, we would reason that you should also have dirty hands.

5 Appendix 2: Transcription conventions

(77) Transcriptions of Sakha sounds.

Mine	Саха	IPA	Turkic	Notes
a	⟨А,а⟩	[a]	A,a	
b	⟨Б,б⟩	[b]	B,b	
v	⟨В,в⟩	[v]	V,v	Russian loans
g	⟨Г,г⟩	[g]	G,g	
q	⟨Ҕ,ҕ⟩	[ʁ,ɣ]	Ğ,ğ	[ɣ] following low vowels
d	⟨Д,д⟩	[d]	D,d	
dj	⟨ДЬ,дь⟩	[ʤ]	*n/a*	
e, je	⟨Е,е⟩	[e,je]	e, ye	Russian loans
jo	⟨Ё,ё⟩	[jo]	yo	Russian loans
zh	⟨Ж,ж⟩	[ʒ]	J,j	Russian loans
z	⟨З,з⟩	[z]	Z,z	Russian loans
i	⟨И,и⟩	[i]	İ, i	
j	⟨Й,й⟩	[j, j̃]	Y,y	
k	⟨К,к⟩	[k]	K,k	
l	⟨Л,л⟩	[l]	L,l	
m	⟨М,м⟩	[m]	M,m	
n	⟨Н,н⟩	[n]	N,n	
ŋ	⟨Ҥ,ҥ⟩	[ŋ]	Ñ, ñ	
nj	⟨НЬ,нь⟩	[ɲ]	*n/a*	
o	⟨О,о⟩	[o]	O,o	
ö	⟨Ө,ө⟩	[ø]	Ö,ö	
p	⟨П,п⟩	[p]	P,p	
r	⟨Р,р⟩	[ɾ]	R,r	
s	⟨С,с⟩	[s]	S,s	
h	⟨Һ,һ⟩	[h]	H,h	
t	⟨Т,т⟩	[t]	T,t	
u	⟨У,у⟩	[u]	U,u	
ü	⟨Ү,ү⟩	[y]	Ü,ü	
f	⟨Ф,ф⟩	[f]	F,f	Russian loans
x	⟨Х,х⟩	[q, x]	X,x	[q] syllable initial
ts	⟨Ц,ц⟩	[ts]	*n/a*	Russian loans
č	⟨Ч,ч⟩	[c]	Ç,ç	
sh	⟨Ш,ш⟩	[ʃ]	Ş,ş	Russian loans
ch	⟨Щ,щ⟩	[ɕː]	*n/a*	Russian loans
n/a	⟨Ъ,ъ⟩	[.]	*n/a*	Russian loans
ɨ	⟨Ы,ы⟩	[ɨ,ɯ]	ı	Usually described as [ɯ], though consultant [ɨ]
j	⟨Ь,ь⟩	[ʲ]	*n/a*	palatalization, Russian loans
e	⟨Э,э⟩	[e]	E,e	
ju	⟨Ю,ю⟩	[ju]	yu	Russian loans
ja	⟨Я,я⟩	[ja]	ya	Russian loans

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