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On Old English *swa* ‘so’

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This paper investigates the semantics of Old English *swa* ‘so’. The word is indicative of diverse sentence interpretations (for example as equatives, conditionals and subordinate clauses of manner). Compositional semantic analysis reveals that nonetheless, its semantic contribution can be unified into two basic functions: marking definiteness and marking predicate abstraction. The interplay of the two and the possibility of covert marking of definiteness and abstraction links the two cases, revealing a path to reanalysis and semantic change. The analysis can be seen as an investigation into the basic semantic building blocks that go into the construction of complex sentence meanings.

1. Introduction

This paper presents a study of Old English (OE) *swa*, a word that can be loosely translated as 'so'. *Swa* can be indicative of a variety of interpretive contexts. The goal of the study is to figure out its semantics. Compositional semantic analysis reveals, I argue, that *swa* can make two basic interpretive contributions to its sentence context. First, it can mark predicate abstraction, and second, it can spell out definiteness. It does both for several semantic types (degrees, properties and others). I show that this analysis accounts for diverse types of use of *swa*. The analysis also suggests an interesting link between the two semantic contributions of marking definiteness and marking predicate abstraction. Their connection leads to an ultimately unified view of OE *swa*, and to a general perspective on the interplay of these two semantic operations.

To give the reader a first impression, (1)–(4) illustrate some common uses of *swa*. The element can be a degree pronoun as in (1) or a manner pronoun as in (2). It can introduce a subordinate clause of manner as in (3), and it indicates degree equatives, (4). (The reader is referred to the appendix for a detailed discussion of the examples presented in this paper, including my data source, the method of data collection and the presentation of the examples).

(1) a. Oðer for ðæm ege, ðe he ondred ðæt he hit **sua** medomlice don ne meahte,
other for the fear that he dreaded that he it so worthily do not might
him wiðsoc.
it refused
(cocura,CP:7.49.4.272)
'The other, through fear of not doing it **so** well, refused.' (Sweet)

b. Context: This we can clearly understand, if we think of the two prophets
whom God wished to send to teach. The one voluntarily undertook the teaching
and the journey.

c. *swa*: the degree d such that the first one does d-well

(2) a. **swa** mot se hlaford mid þy men feohtan.
so may the Lord with the man fight
(colawaf,LawAf_1:42.5.150)
'**likewise** the lord may fight with the man'

b. Context:
We also say that a man may fight with his lord, if someone fights this lord;

c. *swa*: the manner P such that the man fights with the lord in manner P
(i.e. legally, with the king's permission)

(3) a.

& he	brytniæ	**swæ**	higum	maest	red	sie	& ðaem	sawlum	soelest.
& he	distribute	so	convent	most	advantageous	is	& the	souls	best

(codocu1,Ch_1188_[HarmD_1]:27.10)

‘and he is to distribute them **as** may be advantageous to the brethren and most efficacious for the souls of Oswulf and Beornthryth.’ (Harmer)

b. ‘*as* is most advantageous to the convent [~~XP~~ that he distribute them _]’:

λP. it is most advantageous to the convent that he distribute them in manner P

(4) a.

Gif	him	ðonne	God	ryhtlice	& stræclice	deman	wile,	& he
if	them	then	God	rightously	& severly	judge	want	& he
him	for	his	mildheortnesse		ne arað,	ðonne	beoð	hie
them	for	his	mercy		not ?spare	then	are	they
sua	monegum		scyldum	scyldige	**sua**	hie	manegra	
so	many		sins	guilty	so	they	many	
unðeawa		gestiran	meahton	mid	hiora	larum	&	bisenum,
faults		correct	might	with	their	teaching	&	example
gif	hi	ongemong	monnum	beon	wolden.			
if	they	among	men	be	wanted			

(cocura,CP:5.45.20.257)

‘But if God determines to judge them righteously and severely, and does not of his mercy spare them, they are guilty of **as** many sins **as** they could have corrected faults with their instruction and example, if they had been willing to associate with men’ (Sweet)

b. ‘they are guilty of *as* many sins *as* they could have corrected faults’:

the degree d such that they are guilty of d-many sins reaches or exceeds

the degree d such that they could have corrected d-many faults

It is not obvious what the common semantic denominator is in these data, which do not exhaust the possible uses of *swa*; section 2 below provides a more complete picture. In order to better understand the item’s contribution, I have conducted a small corpus study (described in the appendix), and identified the interpretations of the data thus collected. Compositional analysis of *swa* in the various interpretive contexts found in this corpus study indicates that it can serve two basic semantic functions: it can mark definiteness, and it can indicate predicate abstraction. In both functions it is type variable. The proposal is summarized informally in (5). A detailed compositional analysis is required to show that the range of uses of *swa* can be reduced to these two basic contributions.

(5) a. swa_{def} : definiteness marking - "the"
b. swa_{abs} : marking predicate abstraction - "$\lambda\alpha$"

The paper is structured as follows: In section 2 I present an overview of the data I have collected. In section 3 I turn to the semantic analysis, starting with the compositionally simpler examples. Those turn out to be uses as pronouns, relativizers, subordinating conjunctions and conditional markers. Section 4 analyses compositionally more complex cases, equatives and consecutives. Taken together, the analyses in sections 3 and 4 support the proposal that (5) mnemonically represents. I provide a summary in section 5, which also presents possible extensions to further example types that use *swa*, and theoretical consequences of the analysis. The results of my research on OE *swa* are examined there as a contribution towards identifying the basic semantic building blocks that the grammar of natural language makes use of, and to figuring out how they are morphosyntactically realized (a research program that is outlined for compositional semantic theory by von Fintel & Matthewson 2008).

The appendix provides information on the empirical basis of the paper as well as further examples.

2. Empirical overview of the Old English data

This section presents a survey of the kinds of data found in the corpus search. It will become clear that *swa* can occur in diverse sentence contexts. The diversity here concerns both the semantic type of *swa* and its compositonal environment (the construction it occurs in). In terms of semantic type, *swa* shows up as a degree expression (type $<d>$) and as a manner or property expression (types $<v,t>$ or $<e,t>$); but there are also uses connected to type $<s>$ of possible worlds, type $<i>$ of times and type $<e>$ (individuals). In terms of constructions we see *swa* functioning as a pronoun, as introducing subordinate clauses, introducing equatives and consecutives, and indicating conditionals. The following subsections provide an illustrating example of each of these possibilities, together with a first idea of the semantic analysis that the example guides us towards, in anticipation of sections 3 and 4.

2.1. Pronominal uses of *swa*

The first type of use of *swa* we consider is as a degree pronoun. In examples (1) and (6), *swa* shows up in the context of a gradable predicate (*worthily* in (1) and *familiar* in (6)). In both examples, it receives its interpretation from the context, as explained in (1b, c) and (6b, c).

(6) a. ic ne eom him **sua** hiwcuð.
I not am him so familiar
(cocura,CP:10.63.3.395)
'I am not familiar enough with him.' (Sweet) ' … **that** familiar…'

b. Context: … if a criminal comes to one of us, and prays him to lead him to a man in power who is angry with him, and intercede for him? If he is not known to me, or any man of his household, I shall very soon answer him and say: “I cannot undertake such an errand:

c. *swa*: the degree d such that I would have to be d-familiar with him

Against the background of the semantic analysis of comparison constructions (c.f. e.g. von Stechow 1984; Beck 2011), we can assume an analysis following Hohaus et al. (2015) of *swa* as a pronoun of type <d>, where <d> is the type of degrees. As a first step towards an analysis, I present (7) (to be refined below). (8) shows how the element fits into its compositional environment (for the convenience of the reader, I render the OE example (6a) in Present Day English (PDE) words and word order in (8a); the use of *swa* indicates that I intend this to reflect the semantic properties of the OE example, not as an analysis of PDE).

(7) **degree pronoun *swa* (preliminary):**

$[[\text{swa}_{j,<d>}]]^g = g(j_{<d>})$
= the degree d such that I would have to be d-familiar with him
‘**that** familiar’ (example (6a))

(8) a. I am not *swa* familiar with him.

b. [[familiar]] = λd.λy.λx.x is d-familiar with y type <d,<e,<e,t>>>

c. It is not the case that I am familiar with him to degree g(j) (where the context determines that g(j)= the degree d such that I would have to be d-familiar with him).

Pronominal *swa* is possible with other semantic types. (9), like (2), exemplifies a manner pronoun.

(9) a.

Se	ðe	ænigne	ðissa	ierminga	besuicð,	him	wære
who	that	any	(of) these	wretched	deceives	him	were
betere	ðæt	him	wære sumu	esulcweorn	to ðæm	suiran	
better	that	him	were some	millstone	to the	neck	
getiged,		& **sua**	aworpen	to sæs	grunde.		
tied		& so	thrown	sea’s bottom			

(cocura,CP:2.31.14.140)

‘He who deceives one of these little ones, it were better for him to have a millstone tied to his neck, and **so** to be thrown to the bottom of the sea.’ (Sweet)

b. *swa*: the manner P such that he be thrown to the bottom of the sea in manner P (where the context determines that P=with a millstone tied around the neck)

I take these examples to involve properties of events, type <v,t> (see e.g. Meier 2000; Umbach & Gust 2014; 2020; Hohaus & Zimmermann 2021). A first approximation of their semantic contribution is given in (10) for example (9).

(10) **property/manner pronoun *swa* (preliminary)**:

a. $[[swa_{i,<v,t>}]]^g = g(i_{<v,t>})$
$= $ with a millstone tied around the neck
'**so** thrown to the bottom of the sea' (example (9a))

We return to the pronoun examples and their analysis in section 3, where—by refining (7) and (10)—a connection will be made to analyses of pronouns as definite descriptions (e.g. Elbourne 2013).

2.2. *Swa* introducing subordinate clauses

In this subsection we see examples of a common use of *swa* which can be described as a subordinating conjunction. Like example (3), (11) illustrates *swa* as an expression that introduces subordinate clauses of manner.

(11) & bete, **swa** him ryht wisige.
& make amends as him law orders
(colawine,LawIne:5.16)
'and make amends, **as** the law provides'

The subordinate clause in (12) is of a temporal nature rather than a manner clause.

(12) Ac sona **sua** he ðone anwald onfeng ðæs rices, he astag on ofermetto,
but soon as he the rule received the kingdom he rose in pride
(cocura,CP:3.35.15.175)
'But as soon **as** he obtained the rule of the kingdom, he became proud,' (Sweet)

The relative clause example in (13) is to be considered in connection to the other subordinate clauses in this subsection:

(13) & suilc man **sue** hit awege, ðonne se hit on his sawale, nas on ðes ðe hit
& such man so it weighs (?) then be it on his soul neg on that that it
don het.
done commanded
(codocu1,Ch_1195_[HarmD_5]:14.79)
'and whosoever fails to perform this, be it on his soul, and not on the soul of him who has commanded it to be done.' (Harmer) 'such a man **as** fails to perform this…'

These data indicate a different semantic role for *swa* than the pronoun examples in the previous subsection. A standard analysis of relative clauses (see e.g. Heim & Kratzer 1998) aligns with e.g. Meier (2000) on subordinate manner clauses and e.g. Romero & von Stechow (2008) on temporal subordinate clauses, where these examples are analysed in terms of lambda abstraction. (14)

demonstrates for the examples at hand. In each case, *swa* is moved, leaving a coindexed trace, and triggers the composition rule Predicate Abstraction (Heim & Kratzer 1998). See section 3 below for more semantic detail.

(14) **abstractor *swa***:

a. [[[swa2 [t_2 hit awege]]]] <e,t>
= [λx. x fails to perform this]
'**who** fails to perform this' (example (13))

b. [[[swa3 [him riht wisige [~~XP~~ … t_3 bete]]]] <<v,t>,t>
= [λP. the law provides that he make amends in manner P]
'**as** the law provides' (example (11))

c. [[sua2 [he t_2 ðone anwald onfeng ðæs rices]]]] <i,t>
= [λt. he obtained the rule of the kingdom at t]
'**when** he obtained the rule of the kingdom' (example (12))

2.3. *Swa* occuring in equatives

OE *swa* is frequently used in equative constructions. (15) is another example of an OE degree equative. Interestingly, the overt marking of the equative (corresponding to *as* … *as* … in PDE) is by way of three occurrences of *swa* in (15): one occurence in the matrix clause and two in each of the (coordinated) subordinate clauses of the equative, *sua sua hit niedðearf sie* and *sua sua he mæge hie iðelice butan sare of aceorfan*.

(15)

Be	ðæm	wæs	suiðe	wel	gecueden		ðæt	se	efsigenda		efsode
by	that	was	very	well	said		that	the	cutter		cut
his	heafod,		ðæt	is	ðæt	he	**sua**	geornfullice		sie	ymb
his	head		that	is	that	he	so	diligently		be	about
ða	giemenne		ðissa	hwilendlicra		ðinga	**sua**	**sua**	hit	niedðearf	
the	care		the	transitory		things	so	so	it	needful	
sie,	ond	ðeah	**sua**	**sua**	he	mæge	hie	iðelice	butan		sare
be	and	though	so	so	he	may	them	easily	without		pain
of	aceorfan		ðæt	hie	to	ungemetlice		ne	forweaxen;		…
of	cut of		that	they	too	immoderately		not	grow		

(cocura,CP:18.141.2.957)

'About which it was well said that the cutter was to cut his hair, in other words, that he is to be **as** zealous **as** is needful in the care of transitory things, and yet **so as** easily to be able to clip them without pain to prevent their growing too luxuriantly; …' (Sweet)

It is also possible, as (4) and (16) show, to form an OE equative with only one occurrence of *swa* in the subordinate clause, here: *sua ure selfra*.

(16)

Gief	we	ðonne		habbað	**sua**	micle	sorge	& **sua**	micle
if	we	then		have	so	much	trouble	& so	much
gieman	urra	niehstena	**sua**	ure	selfra,	ðonne	hæbbe	we	begen
care	our	neighbours	so	our	selves	then	have	we	both
fet	gescode	suiðe	untællice;						
feet	shod	very	blamelessly						

(cocura,CP:5.45.10.254)

'If we take **as** much trouble and care about our neighbours **as** ourselves, we have both feet shod very blamelessly;' (Sweet)

For a first idea of the semantics of equatives, a simple example of a PDE degree equative is given in (17), together with its standard semantics (see von Stechow 1984 for their classical analysis, and e.g. Hohaus & Zimmermann 2021 and Penka 2021 for recent discussion and further references). The main clause and the subordinate clause ultimately contribute one degree each, which are the input to a comparison of equality.

(17) a Billy is as tall as Alex.

b. [[[$_{\text{matrix}}$ Billy is as tall [$_{\text{subordinate}}$ as Alex ~~is tall~~]]]] = 1
iff the maximal degree of height that Billy reaches
reaches or exceeds the maximal degree of height that Alex reaches
iff Height(Billy) ≥ Height(Alex)
'Billy's height reaches or exceeds Alex's height.'

Equatives raise interesting questions about the compositional path that leads to these truth conditions: what provides us with the two degrees that are compared, and where does the comparison operation come from? These questions will be addressed for OE equatives in particular in section 4. To anticipate, both pronoun uses and abstractor uses of *swa* will play a role in the analysis, linking the observations from sections 2.1. and 2.2.

Before we move on, we note that OE *swa* in addition to degree equatives (involving type <d>) marks property equatives, involving type <v,t> (see especially Hohaus & Zimmermann 2021). Property equatives show the same pattern with *swa* as degree equatives, with a total of either three occurrences of the word (18a), or two, (18b).

(18) a.

Forðæm	**sua**	**sua**	unwærlicu	&	giemeleaslicu	spræc	menn	dweleð,	**sua**	eac
because	so	so	unguarded	&	careless	speech	men	lead astray	so	also

sio	ungemetgode	suige	ðæs	lareowes	on	gedwolan	gebringð	ða	ðe
the	excessive	silence	the	teacher	in	error	brings	them	that

he	læran	meahte,	gif	he	sprecende	beon	wolde.
he	teach	may	if	he	speaking	be	wanted

(cocura,CP:15.89.7.571)

'For **as** unguarded and careless speaking leads men astray, **so** the excessive silence of the teacher leads into error those whom he might teach if he were willing to speak.' (Sweet)

b. **Sua** se æppel bið betogen mid anfealdre rinde, &
so the apple is covered with onefold rind &
ðeah monig corn oninnan him hæfð, **sua** sio halige cirice
though many seed within it has so the holy church
unrim folces befehð mid anfealde geleafan,
innumerable people comprehends with onefold belief
(cocura,CP:15.95.5.619)
'**As** the apple is covered with a single skin, and yet has many pips inside it, **so** the holy church encloses a multitude of people with one faith,' (Sweet)

As a first intuition, OE property equatives seem to relate to both the subordinate manner clauses with *swa* (in terms of their subordinate clause) and the manner pronoun uses of *swa* (the occurence in their main clause). If this intuition is borne out, as section 4 argues, then equatives show both pronoun uses and abstractor uses of *swa* at the same time. Equatives with three occurences of *swa* prove particularly interesting. I will argue in section 4 that they further support an analysis of *swa* as a definiteness marker.

2.4. Consecutives with *swa*

There is one more degree construction that can be marked by *swa* in OE, namely what amounts semantically to a consecutive (see Meier 2000; 2003). (19) provides an example of such an interpretation.

(19) Se ceac wæs **sua** micel **ðæt** he oferhelede ða oxan ealle, buton ða heafudu
the basin was so big that it covered the oxen all except the heads
totodon ut.
peeped out
(cocura,CP:16.105.4.688)
'The basin was big enough to cover the oxen entirely, except the projecting heads.'
(Sweet) '… **so** big **that** …'

There is a fairly transparent relation to PDE consecutives like (20). A preview to Meier's semantic analysis is sketched in (21). The intricate composition of consecutive comparisons will be tackled in section 4.

(20) The basin is so big that it covers the oxen.

(21) The degree d such that the basin is d-big reaches or exceeds the degree needed in order to cover the oxen.

With consecutives as well we find non-degree counterparts to the degree construction in (19). (22) exemplifies this for OE. The PDE non-degree consecutive in (23) indicates that such examples once more talk about properties of events, i.e. manners (Meier 2000).

(22)

& **sua**	ðurhfærð	his	andgit		ðæt	mod	his	hieremonna
& so	penetrates	his	understanfing		the	mind	his	subjects
ðætte	him	bið	eall	cuð	ðæt	hie	unaliefedes	ðenceað.
that	him	is	all	known	that	they	illicit	think

(cocura,CP:21.155.8.1057)

'and thus his understanding penetrates the heart of his subjects, **so that** all their unlawful thoughts are known to him.' (Sweet)

(23) a. Lyn's understanding penetrated Edmund's heart so that his thoughts were known to her.
b. The way in which Lyn's understanding penetrated Edmund's heart was the way needed in order to know his thoughts.

We return to these data in section 4 as well.

2.5. Conditionals marked by *swa*

In some rare but interesting examples, *swa* occurs in the antecedent of a conditional in the position in which *gif* 'if' would be more expected. (24) is an instance of this.

(24)

Gif	hwa	stalie,	**swa**	his	wif	nyte	& his bearn,	geselle	LX	scillinga	to	wite.
if	who	stells	so	his	wife	not.know	& his children	give	60	shillings	to	punishment

(colawine,LawIne:7.26)

'If someone steals, **if** his wife and his children don't know, let him give 60 shillings as fine.'

Section 3 explores how such occurrences can be reconciled with the established semantic roles of *swa*.

2.6. Examples not to be analysed in detail

Some further types of examples show up in the corpus search that will not be subject to a detailed analysis in this paper. The first of these is Free Choice relative clauses (see e.g. Hirsch 2015); it is well known (e.g. Truswell & Gisborne 2015) that in OE Free Choice relative clauses, the wh-expression co-occurs with two *swa*s as shown in (25).

(25)

ond	**sua**	hwelc	**sua**	wille	betweoxn	eow	mæst	beon,	sie	se	eower	ðeow.
and	so	which	so	wants	between	you	most	be	be	that	your	slave

(cocura,CP:17.121.4.810)

'and whoever whishes to be greatest among you, shall be your slave.' (Sweet)

There are data in which *swa* seems to connect two conjuncts, like a polysyndetic coordinator (e.g. Mitrovic & Sauerland 2014; 2016), as in (26).

(26) & geðence he simle sie **sua** æðele **sua** unæðele suæðer he sie ða
& think he always be so noble so common whichever he be the
æðelu ðære æfterran acennesse, ðæt is on ðæm fulluhte,
nobility the afterwards nativity that is in the baptism
(cocura,CP:14.85.14.552)
'and whether he be noble or of low birth, let him ever consider the nobility of regeneration, which is in baptism,' (Sweet)

Finally, some comparison constructions are translated as and reminiscent of so-called comparative conditionals (e.g. Beck 2012a), for instance (27).

(27) **Sua** micle he mæg ieð his hieremenn geteon to beteran, &
so much he may easier his subjects bring to better &
he bið **sua** micle sel gehiered **sua** he ufor gestent
he is so much better heard so he higher stands
on his lifes geearnungum.
in his life's merits
(cocura,CP:14.81.16.532)
'He can the more easily improve his disciples, and the better he will be heard, the higher he stands in his life's merits.' (Sweet)

I will offer an outlook on how these examples relate to the proposals in the main parts of the paper in section 5.2.

2.7. Summary of empirical results and preview

The data collected in this section appear quite diverse. (28) summarizes the main uses of *swa* that we have seen (which are in keeping with the descriptive literature; see for example the Bosworth & Toller (1898; 1921) dictionary and König & Vezzozi's (2022) recent paper, as well as references therein).

(28) pronoun, subordinating conjunction, equative marker, consecutive marker, conditional

The diversity in (28) makes it difficult to identify the item's semantic contribution. It is not obvious, for example, what a common denominator of the conditional, the pronoun and the equative uses could be. At the same time, it is unattractive to assume several unconnected semantic denotations for this lexical item. This is especially unappealing in view of the fact that similar patterns linking some of these uses show up in other languages, e.g. in PDE for *so* and *as* (see e.g. Slade 2011 and Mitrovic & Sauerland 2016 for a parallel argument, concerning different particles).

My strategy in the next sections is reductionist. I analyse the composition of OE complex structures like equatives and identify simpler component parts that go into composing the overall truth conditions. The contribution of *swa* can then be understood as one of these components. The same component can be seen to be at work in other OE constructions as well.

Section 2 has taken some first steps towards identifying which component or components *swa* contributes. We have seen preliminary analyses of pronoun and subordinator uses of *swa* along the lines of (29) and (30).

(29) **pronoun *swa* (preliminary)**:

a. $[[\text{swa}_{j,<d>}]]^g = g(j_{<d>})$
= the degree d such that I would have to be d-familiar with him
'**that** familiar' (example (6a))

b. $[[\text{swa}_{i,<v,t>}]]^g = g(i_{<v,t>})$
= with a millstone tied around the neck
'**so** thrown to the bottom of the sea' (example (9a))

(30) **abstractor *swa***:

a. [[swa2 t_2 hit awege]] $<e,t>$
= [λx. x fails to perform this]
'**who** fails to perform this' (example (13))

b. [[[swa3 [him riht wisige [~~XP~~ … t_3 bete]]]] $<<v,t>,t>$
= [λP. the law provides that he make amends in manner P]
'**as** the law provides' (example (11))

Does this address the other example types identified above? That is: can we analyse the remaining interpretations—conditionals, equatives, consecutives—in such a way as to reduce the contribution of *swa* to these two semantic concepts? I will argue below that a refinement of (29) and (30) can indeed accomplish that. A detailed compositional analysis is required to show how.

Here is a short preview: First, I adopt an analysis of pronouns as definite descriptions (e.g. Elbourne 2013). The first semantic concept contributed by *swa* then amounts to taking it to be a marker of definiteness. This can be extended to conditionals: An analysis of conditionals in terms of reference to possible worlds (Stalnaker 1968; Schlenker 2004; Bhatt & Pancheva 2006; Kleindinst 2007) adds type $<s>$ to the types $<d>$, $<e,t>$, $<v,t>$ above of definite *swa* and allows us to stick with the 'definiteness marker' option.

Next, we need to add an understanding of *swa*'s semantic contributions in equatives and consecutives. A compositional analysis of these constructions is required to see how the overall semantics arises. Once such an analysis is in place, the role of *swa* can be identified. We will see that both semantic contributions—definiteness marker and abstractor—participate in the composition; this is particularly transparent in the equatives with three occurrences of *swa*. The resulting picture is (5) from the introduction.[1]

(5) a. swa_{def} : definiteness marking - “the”
b. swa_{abs} : marking predicate abstraction - “λa”

It emerges from this preliminary sketch that the data can be divided into compositionally fairly straightforward cases (pronouns, abstractors and conditionals) versus compositionally more complex cases (equatives and consecutives). The first set will be analysed in section 3. On this basis, the second set will receive a compositional analysis in section 4. The data from section 2.6. will be discussed separately in section 5.

3. Analysis I: The compositionally simple cases

This section presents the semantic baseline. I argue that it is possible to reduce all the diverse semantic contexts in which *swa* occurs to two contributions of the item itself: definiteness and predicate abstraction. (I have not been able to reduce its contribution to just one of those two. See section 5 for discussion of how they can be connected.) Subsection 3.1. presents an analysis of *swa* pronouns as definite descriptions. Conditional *swa* can then be seen as another instance of definiteness marking. Subsection 3.2. analyses the data points in which *swa* indicates predicate abstraction. Subsection 3.3. summarizes.

3.1. Definiteness marking

3.1.1. Pronoun *swa* revisited

First, we take a closer look at pronouns. There is a body of literature (see e.g. Elbourne 2013; Patel-Grosz & Grosz 2017 and references therein), extending an E-type analysis (e.g. Heim 1990), that argues that pronouns are generally definite descriptions in disguise. A simplified application of such a semantics to an individual denoting pronoun (type $<e>$) is shown in (31). (31a) is a more fine-grained structure for the pronoun; it consists of a definite article *def* and a covert restriction *C*. (31b) is a standard lexical entry for the definite article contained in it; I write *def* to represent syntactic category-neutral definiteness. It will be obvious to the reader that [[*def*]] = [[the]]. (31c) is the resulting semantics of the pronoun.

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[1] An anonymous reviewer points out that these two semantic functions parallel two classical type shifting operations from Partee (1986): Lift and Lower. Partee’s type shifters apply in the nominal domain and shift e.g. $<e,t>$ to $<e>$. This interesting parallel may well be a pointer to very fundamental semantic operations that apply across semantic types, cf. the research program identifying semantic atoms mentioned above.
I do not analyse swa_{def} or swa_{abs} as type shifts. Rather, they perform the function of the shifts in the syntax. Section 5 examines this issue in terms of the syntax/semantics interface

(31) Pronouns revisited:

a. he_3 = [*def* $C_{3,<e,t>}$]

b. [[*def*]] = $\lambda f{:}f \in D_{<e,t>}$ & there is a unique x such that f(x) = 1. the unique x such that f(x) = 1

c. $[[he_3]]^g$ = $[[def]]([[C_{3,<e,t>}]]^g)$
= the unique x such that $g(C_3)(x) = 1$ if there is such a unique x, undefined otherwise.

A slightly modified version of the semantics of *def* is given in (32), which makes the definite determiner able to apply to plurals (Sharvy 1980). It uses the *max* operator (32b). (32c) shows how it determines the referent of a plural definite. The ordering relation underlying the *max* operator "≤" is the part-of-relation in the case of plural individuals (see e.g. Champollion & Krifka 2016). The refined (31c) is given as (31'c) below. In the singular case, *max* requires uniqueness, as before.

(32) a. [[*def*]] = $\lambda f{:}f \in D_{<e,t>}$ & max(λx.f(x) = 1) is defined.max(λx.f(x) = 1)

b. max(P) = the unique z such that P(z) = 1 & for all y such that P(y) = 1: $y \leq z$
(if there is no such unique z, then max(P) is undefined.)

c. [[the dogs]] = max(λx.x are dogs)
= the largest sum of dogs (in the context)

(31') c. $[[he_3]]^g$ = $[[def]]([[C_{3,<e,t>}]]^g)$
= the maximal x such that $g(C_3)(x)$ if there is such a maximal x, undefined otherwise.

This analysis of natural language pronouns can be extended to OE degree pronouns straightforwardly, as (33) shows. I assume with e.g. Hohaus et al. (2015) (based on the classical analysis of degree constructions by von Stechow 1984) that degree pronouns refer to elements of $D_{<d>}$, the denotation domain of degrees. The ontology of type $<d>$ is such that this set is ordered; for example, a height degree of 1.7 m is smaller than a height degree of 1.8 m (see e.g. Klein 1991). We assume for now that the *max* operator is based on the ordering of degrees. (We will return to this issue in section 4, where it is argued that maximality should be replaced by the more general notion of maximal informativity). The structure of the degree pronoun is thus (33a), with the interpretation in terms of definite article plus covert restrictor variable given in (33b). A semantics for an example with a degree pronoun (representing the attested example (1a) above) is given in (34). (34a) is the simplified example, (34b) shows the gradable predicate and (34c) is an informal paraphrase of the truth conditions with the refined semantics of the degree pronoun from (33).

(33) a. $\text{swa}_7 = [\textit{def}\ D_{7,<d,t>}]$

b. $[[\text{swa}_7]]^g = [[\textit{def}]]([[\ D_{7,<d,t>}]]^g)$

$= \max(\lambda d.g(D_7)(d)=1)$,

if there is such a maximal d, undefined otherwise.

(34) a. The other did not do it *swa* well. (cf. (1a))

b. $[[\text{well}]] = \lambda d.\lambda x.x$ is d-good type $<d,<e,t>>$

c. It is not the case that the other did it well to degree $\max(\lambda d.g(D_7)(d)=1)$

(where the context determines $g(D_7)$ - here:

$g(D_7) = [\lambda d.$the first one does d-well]).

Next we consider manner or property pronouns. The case of properties is ontologically more complicated (see e.g. Umbach & Gust (2014; 2020) for recent discussion). But a detailed understanding of property *so* and *such* is not the issue we want to concentrate on here. I will use the simplified analysis in (35) as a stand-in for whatever more fine-grained information could be added. (35a) represents (9) above (once more I use PDE words for the convenience of the reader and indicate by the use of *swa* that the OE structure is meant; I also simplify the original example by cutting out the simple sentence in which the manner pronoun *swa* occurs). (35b, c) apply the refined pronoun analysis to the case of manner (i.e. property of events) examples; and (35d) is an informal statement of the truth conditions predicted for (35a) in the context of the attested example (9).

(35) a. He was thrown *swa* to the bottom of the sea.

b. $\text{swa}_3 = [\textit{def}\ C_{3,<<v,t>,t>}]$

c. $[[\text{swa}_3]]^g = [[\textit{def}]]([[\ C_{3,<<v,t>,t>}]]^g)$

$= \max(\lambda P_{<v,t>}.g(C_3)(P) = 1)$

if there is such a maximal P, undefined otherwise.

d. He was thrown to the bottom of the sea in manner $\max(\lambda P.g(C_3)(P) = 1)$

(where the context determines that

$g(C_3) = \lambda P_{<v,t>}.\ P =$ with a millstone around the neck)

The upshot is that *swa* can semantically function like a pronoun, which is taken here to consist of a definite operator plus covert restriction. The data and analyses we have seen so far demonstrate this for degrees and properties. The analysis of *swa* is summarized in (36), a spelled out version of (5a) from the introduction. (36) says that *swa* in OE is the morphological realization of *def* for types $<d>$, $<e,t>$ and $<v,t>$. (A more familiar morphological realization of the semantically identical *def* would be PDE *the* for type $<e>$, i.e. $[[\text{swa}_{def}]] = [[\text{the}]] = [[\textit{def}]]$.)

(36) definiteness marker (refined):

$[[\text{swa}_{def}]] = [[\textit{def}]] =$

$[\lambda f{:}f\in D_{<x,t>}$ & there is a maximal a such that $f(\alpha)=1.\max(\lambda\alpha.f(\alpha)=1)]$

$(x = <d>, <e,t>, <v,t>)$

3.1.2. Conditional *swa*

A first pay-off of the refined pronoun analysis is that it can be extended to conditional *swa*. This is especially welcome because in the series of sentence contexts in which *swa* occurs, the conditional uses stand out. A standard analysis of conditionals takes them to be universal quantifications over possible worlds, with the *if*-clause serving as part of the restrictor of the universal quantifier (Kratzer 1991 and much further work). Under this analysis, conditional marker *swa* would not be covered by (5). But there is an alternative: an analysis of conditionals in terms of reference to possible worlds (Stalnaker 1968; Schlenker 2004; Bhatt & Pancheva 2006; Kleindinst 2007). According to such an analysis, the subordinate clause is a definite description. An example and its semantic analysis is sketched below. *If* has the same semantics as the definite determiner, but it applies to possible worlds (38a) and yields a plurality of worlds compatible with the subordinate clause (38b) (I remain silent on the details of how the covert accessibility relation R enters the semantics and assume, with Schlenker (2004), that it amounts to 'w' is maximally similar to @'). The familiar semantics comes about by way of distributive predication in the matrix clause (38c,d). See in particular Schlenker (2004).

(37) a. If John's wife didn't know that he stole, he pays 60 shillings.

b. [[$_{\text{subordinate}}$ if [R(@)][John's wife didn't know]] [$_{\text{matrix}}$ he pays 60s]]

(38) a. *if* as *def* $_{<<s,t>,s>}$:
[[if]] = $\lambda p_{<s,t>}$: there is a maximal w' such that p(w').max(λw'. p(w'))

b. subordinate clause:
[[if]]([[R(@) & John's wife didn't know]]) =
max(λw'. w' is maximally similar to @ and unaware(J's wife)(w'))
(if defined; undefined if there is no such maximal w')

c. matrix clause:
λw''.$\forall$w[w $\leq$ w'' $\rightarrow$ pay(60s)(J)(w)]

d. conditional sentence:
$\forall$w[w $\leq$ max(λw'. w' is maximally similar to @ and unaware(J's wife)(w'))
$\rightarrow$ pay(60s)(J)(w)]
'In all worlds that are part of the plurality of worlds maximally similar to @ in which John's wife didn't know he stole, John pays 60s.'

This is the analysis I propose to apply to the OE conditional uses of *swa*. I repeat example (24) below. Obviously (37) cut out the conditional introduced by *swa* in (24) (translating the OE words into PDE and filling in the ellided complement of *know*). The key steps in the composition of that part of (24) are given in (39) (ignoring the anaphoric dependency of *hwa* in the embedding structure and *his*, which is irrelevant to the issue at hand).

(24) Gif hwa stalie, **swa** his wif nyte & his bearn, geselle LX scillinga to wite.
if who stells so his wife not.know & his children give 60 shillings to punishment
(colawine,LawIne:7.26)
'If someone steals, **if** his wife and his children don't know, let him give 60 shillings as fine.'

(39) a. [[swa his_x wif nyte & his_x bearn]] (if defined)
= max(λw'. w' is maximally similar to @ and unaware(x's wife)(w') and unaware(x's children)(w'))
the plurality of worlds maximally similar to @ in which x's wife and x's children didn't know x stole

b. conditional sentence:
∀w[w ≤ max(λw'.w' is maximally similar to @ and unaware(x's wife)(w') and unaware(x's children)(w')) → pay(60s)(x)(w)]
'In all worlds that are part of the plurality of worlds maximally similar to @ in which x's wife and children didn't know x stole, x pays 60s.'

The semantics of *swa* used is (40). Definite *swa* is extended to (41), which simply adds type $<s>$ to the semantic types in (36) that this morphological realization of *def* instantiates.

(40) *swa* as *def* $_{<<s,t>,s>}$:
[[swa]] = $\lambda p_{<s,t>}$: there is a maximal w' such that p(w').max(λw'.p(w'))

(41) **definiteness marker (refined)**:
$[[swa_{def}]]$ = [[*def*]] =
$[\lambda f{:}f \in D_{<x,t>}$ & there is a maximal a such that $f(\alpha)=1.max(\lambda a.f(\alpha)=1)]$
$(x = <d>, <e,t>, <v,t>, <s>)$

This is the first part of the baseline analysis to be proposed. Next we turn to the second part, predicate abstraction.

3.2. Marking Predicate Abstraction

The second basic semantic function that *swa* performs is to mark predicate formation via variable binding (lambda abstraction). I phrase this here in terms of triggering the composition rule Predicate Abstraction (PA) (Heim & Kratzer 1998). This directly accounts for its use as a relative marker. A slightly more detailed analysis of (13) than (30a) is given in (42). I follow here the analysis of *such that* relatives in Heim & Kratzer (1998) in which *swa,* like *such*, functions as a relative pronoun, the grammatical element triggering application of PA in the composition.

(42) a. suilc man sue hit awege

b. [[[CP sue1 [C' [IP t_1 hit awege]]]]]^{g}

= [λx_e.[[[IP t_1 hit awege]]]$^{g[x/1]}$]

= [λx_e. x fails to perform 'it'] <e,t>

c. [[man sue hit awege]]

= [λx. x is a man and x fails to perform 'it']

I take the uses of *swa* as a subordinating conjunction in manner clauses to be indicative of PA as well, this time over a variable of type <v,t>. The plausibility of this suggestion is affected by the composition of the subordinate clause with the matrix clause and the overall meaning. My analysis in (43) is inspired by Meier (2000) for related constructions. (43a) is example (11) above in simplified form. The subordinate manner clause is taken to be interpreted as shown in (43b), with *swa* triggering PA over the variable P ranging over properties of events. An intersective interpretation with the matrix clause and subsequent existential closure yields (43c).

(43) a. He made amends *swa* the law provides.

b. [[[swa3 [him riht wisige [~~XP~~ … t_3 bete]]]] <<v,t>,t>

= [λP. the law provides that he make amends in manner P]

c. ∃P[he made amends in manner P & the law provides that he make amends in manner P]

'There is a way/manner such that he made amends in that way and that way is as the law provides.'

Example (44a) (a simplified version of (12)) requires times instead of events. I take the subordinate clause to be interpreted as shown in (44b), contributing a property of times. The combination with the matrix clause attributes the matrix clause temporal property to the earliest time in the subordinate clause set, (44c) (see e.g. Romero & von Stechow 2008 for relevant discussion). This earliest time could be seen as the maximum relative to the 'early' relation < on times or alternatively as the maximally informative time that has the subordinate clause property—we return to this possibility in section 4. *Swa* can be seen as marking abstraction over a time variable in this and other examples of temporal subordinate clauses.

(44) a. *Swa* he received the rule of the kingdom, he became proud.

b. [[[CP swa2 [C' [IP he t_2 ðone anwald onfeng ðæs rices]]]]]

= [λt. he received the rule of the kingdom at t] 'as/when he received the rule' <i,t>

c. He became proud at the earliest t* such that [λt. he received the rule at t](t*).

Finally we will see in section 4 that some of the occurrences of *swa* in degree equatives (like (15)) are best analysed as abstraction over degree variables. I hint at this in (45) with a simplified substitute for (15) (see section 4 for a detailed analysis of equatives and relevant references).

(45) a. He is *swa* diligent *swa* [*swa* it needful is _].

b. [[[CP swa4 [C' [IP it is needful to be t_4 diligent]]]]]
= [λd. it is needful to be d-diligent] <d,t>

c. His degree of diligence is at least as much as the maximal degree d* such that [λd. it is needful to be d-diligent](d*).

These data motivate an analysis of *swa* as a trigger of Predicate Abstraction for several different semantic types. (46) below restates this proposal, anticipated in (5b) in the introduction.

(46) **marker of predicate abstraction**:

swa_{abs}: trigger of Predicate Abstraction - "λα"
(over variables of semantic types <e>, <e,t>, <v,t>, <i>, <d>, resulting in properties of type <e,t>, <<e,t>,t>, <<v,t>,t>, <i,t>, <d,t>)

It is interesting to note that *swa* is not the primary way of marking <e,t> abstraction, i.e. of forming ordinary relative clauses (properties of individuals). For type <e>, for instance, the demonstrative or relative pronoun *se* is used (see the relative clause in (A11) in the appendix for an example). We may speculate that in OE, type <e> tends to have a dedicated morphology, and the use of *swa* by other semantic types is a default. See section 5 for further discussion.

3.3. Section summary

In this section, I have argued that *swa* used as a pronoun and as a conditional complementizer marks definiteness, (41), and *swa* used as a relativizer and a subordinating conjunction marks Predicate Abstraction, (46). If this is on the right track, there are two basic items *swa*, both for variable semantic types. This outcome is summarized informally in (5) (repeated below).

(5) a. swa_{def} : definiteness marking - "the"

b. swa_{abs} : marking predicate abstraction - "λα"

What we have seen in this section is an application of analyses from current semantic theory to the OE data, motivated by OE's particular properties. The analyses subsume several apparently diverse uses of *swa* (pronouns, conditional markers, subordinating conjunctions of manner and temporal clauses, relative clause markers) under just two semantic concepts. The merits of the proposal will emerge further when its generality is tested against the other data put together in section 2. This is the purpose of section 4, to which we now turn.

4. Analysis II: The compositionally complex cases

This section extends the analysis of *swa* to equatives and consecutives. I provide a compositional semantics further supporting the proposals from section 3. Subsection 4.1. investigates OE equatives, which solidify the picture drawn so far. Subsection 4.2. discusses OE consecutives, which lead us to refine the analysis of definiteness from maximality to maximal informativity, but are a straightforward addition in terms of understanding *swa*'s semantic contribution. A section summary is given in 4.3.

4.1. Equatives

The occurrences of *swa* in OE equatives are best understood against the background of a compositional semantics for equatives. We begin by looking at degree equatives, taking their truth conditions as our starting point. As discussed in section 2, (47a) uncontroversially means (47b) (von Stechow 1984; Hohaus & Zimmermann 2021; Penka 2021; a.o.).

(47) a Billy is as tall as Alex.

b. [[Billy is as tall as Alex]] = 1 iff Height(B) $\geq$ Height(A)
'B's height reaches or exceeds A's height.'

The literature is less unanimous on how to derive these truth conditions, the discussion revealing some crosslinguistic semantic differences between equatives in different languages. I present here the compositional analysis of Penka (2021), who derives the semantics in (47b) without a comparison operator and adopts a degree description analysis for the subordinate clause of an equative construction. I choose this composition of the equative semantics because it is especially suitable for OE (see Penka's paper for arguments and crosslinguistic comparison of PDE and German; see also Umbach 2007 for related suggestions). I first explain the composition on the basis of the PDE example in (47). The analysis is applied to OE in a second step. (I take some presentational liberties, but crucial properties of the analysis are due to Penka 2021.)

According to Penka (2021), the matrix clause of an equative contains simply the unmarked form of the adjective. I take that adjective to combine with a degree pronoun *as* in (48). The main clause of (47) is thus analysed essentially like the degree pronoun examples (e.g. (1), (6)). This is demonstrated in (48).

(48) a. $[_{\text{matrix}}$ Billy is as_1 tall]

b. [[Billy is as_1 tall]]^g = 1 iff [[tall]]([[as_1]]^g)([[Billy]]) = 1
iff [λd.λx.Height(x) $\geq$ d](max(g(1)))(B) = 1
iff Height(B) $\geq$ max(g(1))

We turn to the subordinate clause next. It has to furnish the degree that the matrix clause equals or exceeds, max(g(1)) in (48). I sketch the composition of the subordinate clause in (49). The structure we interpret is (49a): the comparative ellipsis has been filled in, the movement of *as* is represented, and I have added a covert definiteness marker to the structure. (49a) denotes A's height, (49b).

(49) a. [*def* [as2 Alex ~~is t_2 tall~~]]

b. [[[*def* [as2 Alex ~~is t_2 tall~~]]]]^g = max([[[as2 Alex ~~is t_2 tall~~]]]^g)
= max(λd.[[Alex ~~is t_2 tall~~]]$^{g[d/2]}$)
= max(λd.Height(A) ≥ d)
= Height(A)

The main clause degree pronoun *as$_1$* receives its value from the subordinate clause denotation, that is, the pronoun refers to A's height. Identifying max(g(1)) with the meaning of the subordinate clause—i.e. max(g(1)) = Height(A) - yields the desired truth conditions, (47b).

Prepared with this composition of an equative's interpretation, let's approach the analysis of OE. To help us on our way towards the analysis of the attested examples, I consider (50), a constructed example built after the template of OE degree equatives, and the OE counterpart of (47). The example contains three occurrences of *swa*. The order in which they appear is indicated with roman superscripts.

(50) OE degree equative with correlative structure - prototype:
^{i}swa ^{ii}swa tall Alex is, ^{iii}swa tall is Billy.
'B is as tall as A.'

Our discussion up to this point leads us to the structure sketched in (51). The analysis introduced on the basis of PDE (47) applies straightforwardly to (51). The role of the three occurrences of *swa* is quite transparent in light of the compositional derivation (48), (49): the first occurrence is a definite marker, the second an abstractor, and the third is a pronoun (i.e. a definite with a covert restrictor).

(51) structure of (50) - first version:
[[XP ^{i}swa$_{def}$ [$_{subord}$ ^{ii}swa2 Alex ~~t_2 tall~~ is]] [$_{matrix}$ Billy ^{iii}swa$_1$ tall is]]

Let's be more explicit about some of the details in (51). The template I have chosen makes (51) an example of a correlative structure, of which OE has many instances. Example (52) shows a correlative with the pronominal *ða* 'then, there' instead of *swa*.

(52)

Geðenc	hwelc	witu	us **ða**	becomon	for ðisse worulde,		**ða ða**	we hit
consider	which	punishment	us then	befall	for this world,		then when	we it
nohwæðer	ne	selfe	ne lufodon	ne	eac	oðrum monnum	ne	lefdon:
neither	neg	self	neg loved	neg	also	other men	neg	left

(coprefcura,CPLetW+arf:23.10)
'Consider what punishment would come upon us on account of this world, if we neither loved it (wisdom) ourselves nor suffered other men to obtain it:' (Sweet)

Correlatives have received considerable attention in the syntactic literature; see Liptak (2009) for an overview and discussion of correlatives crosslinguistically. I adopt a syntactic analysis of OE correlative structures like (51) following Axel-Tober (2012): the matrix clause is a verb second CP to which the subordinate structure is left adjoined, (53) (see Fischer et al. 2000 for general background on OE syntax). At LF, the pied-piped adjectives are reconstructed, creating the appropriate structure for lambda abstraction over the degree variables (c.f. e.g. Beck 1996), (54). I make one additional assumption seen in (55): the matrix clause contains a covert operator I call IDENT. (55) is, finally, the structure of (50) that is compositionally interpreted.

(53) surface syntax: correlative
[CP [XP ^{i}swa [CP$_{subordinate}$ ^{ii}swa2 … [VP A t_2 tall is]]] [CP$_{matrix}$ [^{iii}swa$_1$ tall]7 [C' is B t_7]]]

(54) LF structure - 1st step:
[CP [XP ^{i}swa [CP$_{subordinate}$ ^{ii}swa2 … [VP A t_2 tall is]]] [CP$_{matrix}$ ^{iii}swa$_1$ [3[C' B t_3 tall is]]]

(55) LF structure - final:
[CP [XP ^{i}swa [CP$_{subordinate}$ ^{ii}swa2 … [VP A t_2 tall is]]]
[CP$_{matrix}$ [^{iii}swa$_1$ IDENT] [3[C' B t_3 tall is]]]]

The operator IDENT is a novel proposal. Its semantics is defined in (56): it fixes the value of the matrix clause pronoun to the denotation of the left adjoined constituent. I take IDENT to be responsible for correlative interpretation: correlatives presuppose that the matrix clause pronoun is assigned the meaning of the left adjoined consituent as its value (a suggestion that can easily be applied to other kinds of correlatives besides the equative analysed here, e.g. (52)).

(56) [[IDENT]] = λd.λD.λd':d = d'.D(d)

The crucial steps in the compositional interpretation of (55) are sketched in (57). We derive the desired equative interpretation.

(57) a. subordinate CP - ^{ii}swa2 triggers Predicate Abstraction 'λd':
[[[CP$_{subord}$ swa2 Alex t_2 ~~tall~~ is]]]^g = [λd. A is d-tall]
= [λd.Height(A) $\geq$ d]

b. left dislocated XP - ^{i}swa = *def*$_{<<d,t>,d>}$:
[[[XP swa$_{def}$ swa2 Alex t_2 ~~tall~~ is]]]^g = [[swa$_{def}$]](λd.Height(A) $\geq$ d)
= max(λd.Height(A) $\geq$ d)
= Height(A)

c. matrix CP - ^{iii}swa$_1$ is a pronoun, i.e. ^{iii}swa$_1$ = *def*$_{<<d,t>,d>}$ with covert D$_1$:
[[swa$_{def}$ D$_1$]]^g = max(g(1))

d. identification of pronoun reference via IDENT:
[[CP$_{matrix}$]]^g = λd'. Height(B) $\geq$ d')
(if max(g(1)) = d', undefined otherwise)

e. application to $[[XP]]^g$ and overall truth conditions:
$[[(55)]]^g$ is only defined if $\max(g(1)) = \text{Height}(A)$.
If defined, $[[(55)]]^g = 1$ if $\text{Height}(B) \geq \max(g(1))$.
'B's height reaches or exceeds A's height.'

We are now ready to analyse the actual OE data. Example (15) is repeated from above.

(15)

Be	ðæm wæs	suiðe	wel	gecueden		ðæt	se	efsigenda	efsode
by	that was	very	well	said		that	the	cutter	cut
his	heafod,	ðæt	is	ðæt	he	**sua**	geornfullice	sie	ymb
his	head	that	is	that	he	so	diligently	be	about
ða	giemenne	ðissa	hwilendlicra		ðinga	**sua**	**sua**	hit	niedðearf
the	care	the	transitory		things	so	so	it	needful
sie,	ond ðeah	**sua**	**sua**	he	mæge	hie	iðelice	butan	sare
be	and though	so	so	he	may	them	easily	without	pain
of	aceorfan	ðæt	hie	to	ungemetlice		ne	forweaxen;	…
of	cut of	that	they	too	immoderately		not	grow	

(cocura,CP:18.141.2.957)
'About which it was well said that the cutter was to cut his hair, in other words, that he is to be **as** zealous **as** is needful in the care of transitory things, and yet **so as** easily to be able to clip them without pain to prevent their growing too luxuriantly; …' (Sweet)

I simplify the example to (58a) (I have removed the embedding structure in (15) and the second conjunct, reducing the example to the core sentence with the equative (minus the PP adjunct *ymb ða giemenne ðissa hwilendlicra ðinga*); I have also rendered the example with PDE words once more for convenience). The truth conditions are given in (58b) (explained in more detail in (58c)). (59) provides crucial steps in the composition.

(58) a. He is *swa* diligent *swa* [*swa* it needful is _].

b. His degree of diligence is at least as much as the maximal degree d*
such that [λd. it is needful to be d-diligent](d*).

c. 'it is needful to be d-diligent':
in all relevant worlds w, $\text{Diligence}_w(H) \geq d$
w1: |---------->
w2: |-------------------->
w3: |----------------------------->
|
max
The maximum diligence reached in all relevant worlds is the maximum in the least diligent world, w1.

(59) a. matrix clause:

[[He is swa$_i$ diligent]]^g = Diligence(H) ≥ max(g(i))

b. subordinate CP:

[[[CP swa4 [C' [IP it is needful ~~to be t$_4$ diligent~~]]]]]

= [λd. it is needful to be d-diligent] <d,t>

c. XP introduced by *swa* is a definite description:

[[[XP swa [CP swa4 [C' [IP it is needful ~~to be t$_4$ diligent~~]]]]]]

= max(λd. it is needful to be d-diligent)

d. identifying max(g(i)) as the subordinate structure:

Diligence(H) ≥ max(λd. it is needful to be d-diligent)

For present purposes, the role of the three *swa*s is what is of particular interest. In (51) and (15)/(58) they are taken to make the semantic contributions highlighted in (60). The first and the third *swa* mark definiteness, with an overt and a covert restrictor respectively. The second occurrence of *swa* is abstractor *swa* and triggers Predicate Abstraction. The analysis is thus a straightforward application of the proposals in section 3. It makes sense of the multiple *swa*s that occur in OE equatives. The combination of the first two *swa*s also supports Penka's analysis of the composition of the subordinate structure (although the combination with the matrix clause is different due to the third *swa* that occurs in OE—see Penka 2021 for this aspect of her analysis).

(60) a. ^{i}**swa**: swa$_{def}$ = *def* (with an **overt** restrictor, the subordinate CP)

b. ^{ii}**swa**: swa$_{abs}$ - triggers PA ("λd")

c. ^{iii}**swa**: swa$_{def}$ = *def* (matrix pronoun - **covert** restrictor)

Examples like (15) and the prototype (51) have two *swa*s in the subordinate structure. The analysis could be seen as taking the first of those - ^{i}*swa* - to be the degree counterpart of Voldemort pronouns *he who must not be named* (Elbourne 2013), where the pronoun combines with an overt restrictor. An even more obvious crosslinguistic counterpart is given in (61): German demonstrative/pronoun *der/die/das* 'the/he/she/it', which can similarly occur with an overt (61a) or a covert restrictor (61b).

(61) a. **Die** Krabbe frass einen Gecko.
the crab ate a gecko
'The crab ate a gecko.'

b. Ein Gecko traf auf eine Krabbe. **Die** hat ihn gefressen.
a gecko met on a crab the has it eaten
'A gecko happened upon a crab. The crab ate it.'

OE equative examples without the first occurrence of *swa* (e.g. (16)) will have to be taken to employ a covert mechanism, for instance a covert shift from a property of degrees to a degree. This could be a covert *max* operator, as in free relative clauses (Jacobson 1995) or it could be an informativity based operator, Fox & Hackl's (2007) *max-inf*, which they apply to degrees as well as to other semantic types. We will come back to this issue in the next subsection.

To round off the discussion, we take a brief look at property equatives. Hohaus & Zimmermann (2021) extend a degree equative analysis to property equatives. I follow them here, but by way of extending the Penka-style analysis above (see also Penka 2021). We consider the simplified structure in (62) instead of actual OE property equatives, see (18a,b) and (A9a,b) in the appendix for examples ((62) is in fact (A9b) in simplified form).

(62) OE property equative - prototype:
^{i}swa ^{ii}swa they learned in books, ^{iii}swa they actually live.
'They actually live in the way that they were taught to live in books.'

Here, as well, I want to concentrate on the compositional aspects of the analysis rather than peculiarities of properties (of events or individuals). See Hohaus & Zimmermann (2021), Penka (2021) and Umbach & Gust (2014; 2020) for discussion. The structure to be interpreted is (62') (parallel to (55), following the arguments presented above). The steps in the compositional interpretation of (62') are sketched in (63)–(65), in analogy to the degree examples.

(62') [CP [XP ^{i}swa [CP$_{subordinate}$ ^{ii}swa1 … [VP they learned in books to t_1 live]]]
[CP$_{matrix}$ [^{iii}swa$_7$ IDENT] [3[C' they actually t_3 live]]]]

(63) [[[XP ^{i}swa [CP$_{subordinate}$ ^{ii}swa1 … [VP they learned in books to t_1 live]]]]]^g
= [[*def*]]($\lambda P_{<v,t>}$.they learned in books to live in manner P)
= the way they learned to live in books

(64) [[[^{iii}swa$_7$ IDENT] [3[C' they actually t_3 live]]]]]^g
= [[IDENT]]([[swa$_7$]]^g)($\lambda P_{<v,t>}$.they actually live in manner P)
= $\lambda P'_{<v,t>}$.they actually live in manner P' (if [[swa$_7$]]^g = P', undefined otherwise)

(65) [[62']]^g = 1 iff they actually live in the way that they were taught to live in books.
(undefined if swa$_7$ does not refer to the way they learned to live in books)

Other than the change in semantic type from degrees to properties, the example is analysed like the degree equative. The three *swa*s, in particular, have the same semantic roles, namely (60). This concludes my discussion of the compositional semantics of OE equatives.

4.2. Consecutives

We turn to the compositional semantics of OE consecutives in this subsection. The groundbreaking work of Cécile Meier (Meier 2000; 2003) on the semantics of consecutive constructions is the foundation of my discussion. I extend her compositional semantic analysis to OE consecutives in subsection 4.2.1. The analysis replaces the maximality operator in the semantics of definites by a maximal informativity operator (Fox & Hackl 2007). This step is further discussed in subsection 4.2.2.

4.2.1. Compositional analysis of OE consecutives

We begin with degree consecutives and first introduce their truth conditional meaning. I follow Meier, who motivates an intensional semantics for consecutives (I take some presentational liberties with her theory as well, simplifying the analysis in certain respects). Since no modal element is visible e.g. in example (66a), she postulates a covert one. In (66a) (modelled after (19) above), this is a covert necessity modal—a universal quantifier over possible worlds. The restriction of the universal quantifier contains the main clause interpretation. The truth conditions of the example according to this semantics are given in (66b).

(66) a. The basin was so big that it covered the oxen.

b. Size(the basin)(@) $\geq$
min(λd.$\forall$w[wR@ & Size(the basin)(w) $\geq$ d - > the basin covers the oxen in w])
'The size of the basin was at least as large as the minimum size d such that in all relevant worlds in which it is d-large, it covers the oxen.'

(Assuming a circumstantial modal base that is realistic (R(@)(@)), this entails that the basin actually covered the oxen.)

In order to understand these truth conditions, it is helpful to visualize what the size degree is such that if the basin has that size, it covers the oxen. Suppose that the oxen are covered when the basin's size is 600l or larger. (67) depicts such an example scenario. The degree property in (66b) is (68) in this scenario.

(67)
```
w1:  |----->                              (200l)
w2:  |--------------->                    (600l)
w3:  |------------------>                 (700l)
w4:  |----------------------->            (900l)
w5:  |--------------------------->        (1100l)
(…)
                    |
        minimum size required = 600l
```

(68) [λd.$\forall$w[wR@ & Size(the basin)(w) $\geq$ d -> the basin covers the oxen in w]]
= {600l, 700l, 900l, 1100l}

We are interested in the smallest degree in this set, 600l: (66a) states that the basin reached or exceeded the smallest size required to cover the oxen. Reducing the set in (68) to its smallest member is indicated by 'min' in (66b). Thanks to more recent theoretical developments, it is possible to refine Meier's analysis in this respect: I suggest that picking the smallest degree from (68) is a matter of informativity. The smallest degree in (68) is the most informative degree in the set: if all worlds in which the basin reaches a size of 600l are worlds in which the basin covers the oxen, then for degrees d' larger than 600l it is also true that all worlds in which the basin reaches size d' are worlds in which it covers the oxen. I follow Fox & Hackl (2007) in assuming a general, type flexible notion of maximal informativity. The version I adopt is given in (69). The origin of this notion is the maximally informative answer to a question (Heim 1994). (70) illustrates an application of maximal informativity to an embedded question. (70a) is the context, the entailment in (70b) shows that Ellen knows the most informative answer to the question. The application of *max-inf* to the question meaning (Hamblin 1973) is shown in (70c) and illustrated in (70d).

(69) max-inf(w)(p<s,<x,t>>) =
ιq.p(w)(q) & ∀q'[p(w)(q') & q≠q' -> [p(w)(q) => p(w)(q')]]
(undefined if there is no such q)

(70) a. Context: Robin drove 80 kmh and no faster.
b. Ellen knows how fast Robin drove.
=> Ellen knows the maximal speed that Robin drove, 80 kmh.
c. max-inf(w)([[how fast Robin drove]])
= max-inf(w)(λw'.λp.∃d[p(w') & p=λw".Speed(w")(Robin)≥d])
= λw".Speed(w")(Robin)≥80 kmh
d. If 'Robin drove 80 kmh fast' is a true answer to 'How fast did Robin drive?', then so is 'Robin drove 79 kmh fast', Robin drove 78 kmh fast' etc. (x=<s,t>)

I further follow Fox & Hackl (2007) and von Fintel et al. (2014) in taking the concept of maximal informativity to be the meaning of definiteness, i.e. [[*def*]] = *max-inf*. The parallel between (70) and (71) is offered in support. (71a) is the contextual situation, and (71b) shows that the reference of the definite DP is the maximal speed in that situation. (71c) is the application of the *max-inf* operator to the DP and (71d) illustrates the inference that *max-inf* is based on.

(71) a. Context: Robin drove 80 kmh and no faster.
b. the speed that Robin drove = 80 kmh
c. max-inf(w)(λw'.λx.x is a speed that Robin drove in w') = 80 kmh
d, If 80 kmh is a speed that Robin drove, then so is 79 kmh, 78 kmh etc. (x=e)

The definition of maximal informativity that we concretely need for consecutives is (72) (with x = d). (See again Fox & Hackl 2007 for an application of maximal informativeness to degrees, though applied to different data.)

(72) $\text{max-inf}(w)(D_{<s,<d,t>>}) =$
$\iota d.D(w)(d)\ \&\ \forall d'[D(w)(d')\ \&\ d \neq d' \rightarrow [D(w)(d) \Rightarrow D(w)(d')]]$

This reasoning about the source of 'min' in (66b) leads us to the derivation in (73) for the truth conditions of (66a). The covert modal in the analysis is represented as *must*. Its covert restriction includes (e.g. via ellipsis) the matrix clause. The LF in (73a) represents this. Reduction to the minimal degree in the subordinate clause is performed by *max-inf*. The content of *max-inf* is attributed to *so* in (73d); in other words, *so* is a definiteness marker. (73e) illustrates once more the inference that yields the maximally informative degree and (73f) offers another paraphrase of the resulting truth conditions, equivalent to the desired (66b).

(73) a. [[so [1[must R [the basin t_1 big] [$_{subord}$ that it covered the oxen]]]]
[$_{matrix}$ 1[the basin was t_1 big]]]

b. [[[$_{matrix}$ 1[the basin was t_1 big]]]] = $\lambda d.\text{Size(the basin)}(@) \geq d$

c. [[must R(w)]] = $\lambda p \lambda q.\forall w'[w'Rw\ \&\ p(w') \rightarrow q(w')]$

d. [[[so [1[must R [the basin t_1 big] [$_{subord}$ that it covered the oxen]]]]]]
= $\text{max-inf}(w)(\lambda w''.\lambda d.\forall w'[w'Rw''\ \&\ \text{Size(the basin} \geq d)$
$\rightarrow \text{cover(the basin)(the oxen)}(w')])$
= 600l (in the scenario in (67), (68))

e. If it is the case that if the basin is at least 600l big, it covers the oxen, then it is also the case that if the basin reaches 700l, it covers the oxen (800l etc.).

f. $\text{Size(the basin)}(@) \geq \text{max-inf}(w)(\lambda w''.\lambda d.\forall w'[w'Rw''\ \&\ \text{Size(the basin} \geq d)$
$\rightarrow \text{cover(the basin)(the oxen)}(w')])$
'The basin's actual size reaches or exceeds the minimal size such that, if the basin is that big, it covers the oxen.'

The example just analysed is equivalent to the actual OE example in (19), repeated below, and structurally parallel. Therefore the same semantic analysis can be applied to OE degree consecutives, as seen in (74). The interpretation shown in (74) reveals this instance of *swa* as another definiteness marker. This is the crucial result for present purposes.

(19) Se ceac wæs **sua** micel **ðæt** he oferhelede ða oxan ealle, buton ða heafudu
the basin was so much that it covered the oxen all except the heads
totodon ut.
peeped out
(cocura,CP:16.105.4.688)
'The basin was big enough to cover the oxen entirely, except the projecting heads.'
(Sweet) '… **so** big **that** …'

(74) a. Se ceac wæs sua micel ðæt he oferhelede ða oxan […].

b. [[swa_{def} [1[must R [se ceac wæs t_1 micel] [$_{subord}$ ðæt he oferhelede ða oxan]]]] [$_{matrix}$ 1[se ceac wæs t_1 micel]]]

c. Size(the basin)(@) ≥ max-inf(w)(λw''.λd.∀w'[w'Rw'' & Size(the basin ≥ d) -> cover(the basin)(the oxen)(w')])

In somewhat less detail, I apply a Meier-style semantic analysis to OE non-degree consecutives. Remember (22) and (23) from section 2.

(22) & **sua** ðurhfærð his andgit ðæt mod his hieremonna
& so penetrates his understanfing the mind his subjects
ðætte him bið eall cuð ðæt hie unaliefedes ðenceað.
that him is all known that they illicit think
(cocura,CP:21.155.8.1057)
'and thus his understanding penetrates the heart of his subjects, **so that** all their unlawful thoughts are known to him.' (Sweet)

(23) a. Lyn's understanding penetrated Edmund's heart so that his thoughts were known to her.

b. The way in which Lyn's understanding penetrated Edmund's heart was the way needed in order to know his thoughts.

For the semantic analysis, I turn straightaway to the constructed prototype example in (75a). Meier (2000) specifies an existential semantics along the lines of (75b) for such data. I propose to shift to (75c) in order to strengthen the parallel to the degree examples.

(75) a. Lyn understood Edmund *swa* that his thoughts were known to her.

b. ∃P[Lyn understood Edmund in manner P in w & ∀w'[w'Rw & Lyn understood Edmund in manner P in w' -> Edmund's thoughts were known to Lyn in w']]

c. Lyn understood Edmund in w in ιP:P = max-inf(w) (λw''.λP'.∀w'[w'Rw'' & Lyn understands Edmund in manner P' in w' -> Edmund's thoughts are known to Lyn in w'])

Should this prove a fruitful analysis of such non-degree consecutives, a derivation along the lines of (76) is possible:

(76) a. [[swa_{def} [1[must R [Lyn understands Edmund t_1] [$_{subord}$ that Edmund's thoughts are known to Lyn]] [1[$_{matrix}$ Lyn understood Edmund t_1]]]

b. matrix: λP. Lyn understood Edmund in manner P in @

c. subord. + modal: λP'.∀w'[w'Rw'' & Lyn understands Ed. in manner P' in w' -> Edmund's thoughts are known to Lyn in w'])
= λP. if Lyn understands Edmund in manner P, then Edmund's thoughts are known to Lyn

d. swa_{def} = max-inf

The role of *swa* is parallel to the degree consecutive (73), (74) above, and the consecutive uses thus fall under the underlying notion of definite *swa*.

4.2.2. Replacing *max* with *max-inf*

The preceding subsection has modified the semantic analysis of definiteness marking: from taking it to denote the familiar maximality operator ([[*def*]] = *max*), we have followed the recent literature in taking it to denote a maximal informativity operator ([[*def*]] = *max-inf*). This subsection examines this perspective shift in more detail. First, we clarify when and why it is useful. Next, we make sure that the welcome results based on the original semantics are maintained. Finally, we reexamine some of our earlier data for which there is an added interest from the semantics discussed in this section.

Beginning with the usefulness of the shift to *max-inf*, remember that the consecutive degree example (66) seemed to use minimality instead of maximality. Maximal informativeness allows us to reduce maximality and minimality to one common element. Whether the minimal or the maximal member of a set is most informative depends on the inferential properties of the predicate (its monotonicity properties, see Beck & Rullmann 1999; Fox & Hackl 2007; von Fintel et al. 2014). (77) illustrates.

(77) a. upward monotone predicate:
If the basin is d_1 large it covers the oxen => if the basin is d_2 large it covers the oxen. valid if $d_2 > d_1$

b. downward monotone predicate:
A is d_1 tall => A is d_2 tall. valid if $d_1 > d_2$

Uniform use of *max-inf* captures the fact that the predicate determines whether the maximal or the minimal element of a set is referred to, without recourse to two different operators. In (78), I demonstrate that *max-inf* can replace *max* in downward monotone degree properties and deliver the desired degree (A's height in the example).

(78) max-inf(w)(λw.λd.Height(A)(w) ≥ d)
= ιd''.[λd.Height(A)(w) ≥ d](d'') & ∀d'[[λd.Height(A)(w) ≥ d](d') & d'' ≠ d' ->
[[λd.Height(A)(w) ≥ d](d'') => [λd.Height(A)(w) ≥ d](d')]]
= Height(A)

See Penka (2021) for arguments in favour of *max-inf* in equatives and Fox & Hackl (2007) and Beck (2012b) for its use in comparative *than*-clauses.

Let's make sure that the original data that were captured with maximality are still covered. This is in particular plural definiteness, illustrated by (79).

(79) [[the dogs]] = max(λx.x are dogs)
= the largest sum of dogs (in the context)

(80) shows that *max-inf* maintains the desired result. See von Fintel et al. (2014) for an analysis of nominal definites in terms of maximal informativity and further arguments in favour of the shift to maximal informativity.

(80) max-inf(w)(λw'.λx.x are $\text{dogs}_{w'}$)= ιz.[λw'.λx.x are $\text{dogs}_{w'}$](w)(z) & ∀z'[[λw'.λx.x are $\text{dogs}_{w'}$](w)(z') & z≠z' -> [[λw'.λx.x are $\text{dogs}_{w'}$](w)(z) => [λw'.λx.x are $\text{dogs}_{w'}$](w)(z')]]
= the largest sum of dogs in w

Finally, we return to a data point from above in which maximal informativity has already come up. Consider once more the exact contribution of the temporal subordinate clause in (81). We analysed *swa* as triggering PA above, (81b).

(81) a. *Swa* he received the rule, he became proud.
b. [[swa2 he received t_2 the rule]] = [λt. he received the rule at t] <i,t>
'as/when he received the rule'
c. He became proud at the earliest t* such that [λt. he received the rule at t](t*).

Since the ultimate result needed for the example overall is (81c), a slightly different perspective becomes possible with *max-inf* at our disposal. This is sketched in (82): *swa* is analysed as *max-inf*, i.e. as definite *swa*, and PA is covert. (See von Fintel et al. 2014 for an application of *max-inf* to times.)

(82) a. max-inf([λt. he received the rule at t])
= the earliest t* such that [λt. he received the rule at t](t*).
b. [swa_{def} [2[he received t_2 the rule]]

Either analysis is possible; *swa* could mark either PA or *max-inf*, and the other operation is covert. Covert *max-inf* has to be assumed e.g. in questions (see (70) (or (A4) for an OE embedded question)). Covert PA has to be assumed e.g. in relative clauses without a relative pronoun (for OE see (1a) with the relative complementizer *ðe* 'that' and no relative pronoun (which would be *se*, see (11), and (A14) with *se ðe*)). I will not make a case for one analysis or the other. Rather, section 5 discusses the bigger picture and argues that both are possible, and that this is instrumental to understanding the semantic contributions of *swa*.

In this context, a second data point to be reexamined is the type of equative with only one *swa* in the subordinate structure rather than two, seen for instance in (16). A corresponding prototype is given in (83).

(83) *Swa* tall A is, *swa* tall is B.

Two perspectives are possible when we relate this two-*swa* equative to the more transparent three-*swa* counterpart: In (84a), I take it that *ⁱswa* is not present in the structure. Definiteness is thus covert. I use *max-inf* to represent it. The visible *swa* is *ⁱⁱswa* which marks PA. Under this view, the operator *max-inf* can be realized either overtly in OE equatives (three *swa* equative) or covertly (two *swa* equative). But similar to example (81a), we might alternatively have taken PA to be covert and the first *swa* to be *max-inf*; this is represented in (84b).

(84) a. [CP [XP max-inf [$CP_{subordinate}$ ^{ii}swa1 … [VP A t_1 tall is]]]
[CP_{matrix} [^{iii}swa$_7$ IDENT] [3[C' B t_3 tall is]]]]

b. [CP [XP ^{i}swa$_{def}$ [$CP_{subordinate}$ 1 … [VP A t_1 tall is]]]
[CP_{matrix} [^{iii}swa$_7$ IDENT] [3[C' B t_3 tall is]]]]

I do not know of a reason to prefer one analysis over the other. It is interesting that both definiteness and PA can be marked overtly or covertly, and that *swa* can be an overt marking of either. This last point is seen clearly in section 3 on the basis of pronouns (where definiteness is marked overtly) and relative clauses and subordinate manner clauses (where PA is marked overtly). The respective other semantics for *swa* would lead to an uninterpretable overall structure (e.g. definite *swa* in *man sue hit awege* would yield type <t> for *sue hit awege*, which would not compose with its sentence context). We come back to the issue of the vacuous ambiguity in (84) in section 5, where it is shown to be instrumental to linking the two *swas*, swa_{def} and swa_{abs}.

It makes sense at this point to offer the general definition of definiteness marking in terms of *max-inf*, following Fox & Hackl (2007) and von Fintel et al. (2014):[2]

(85) a. [[*def*]] = max-inf

b. the definite determiner (e.g. PDE *the*) spells out *def* for type <e>

c. *swa*$_{def}$ spells out *def* for types <d>, <e,t>, <v,t>, <s>

(86) **definiteness marker (final):**

$[[swa_{def}]] = [[def]] = \text{max-inf} =$

$\lambda w.\lambda p_{<s,<x,t>>}.\ \iota q.p(w)(q)\ \&\ \forall q'[p(w)(q')\ \&\ q \neq q' \rightarrow [p(w)(q) \Rightarrow p(w)(q')]]$

(x = <d>, <e,t>, <v,t>, <s>)

4.3. Section summary

This section has applied the proposal from section 3 to further data. The final version of (5) from the introduction is spelled out in (87).

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[2] In the newer literature, maximal informativity is often explored in the context of the operator EXH (e.g. Fox 2007; Chierchia et al. 2011). A question I will not address is whether *max-inf* as used here can be reduced to EXH.

(87) a. swa_{def}: definiteness marking *def*

$$\text{max-inf} = \lambda w.\lambda p_{<s,<x,t>>}.\ \iota q.p(w)(q)\ \&\ \forall q'[p(w)(q')\ \&\ q \neq q' \text{ -> } [p(w)(q) \text{ => } p(w)(q')]]$$

$(x = <d>, <e,t>, <v,t>, <s>)$

b. swa_{abs}: trigger of Predicate Abstraction - "λα"

(over variables of semantic types $<e>$, $<e,t>$, $<v,t>$, $<i>$, $<d>$, resulting in properties of type $<e,t>$, $<<e,t>,t>$, $<<v,t>,t>$, $<i,t>$, $<d,t>$)

A detailed semantic analysis of equatives and consecutives shows that these data corroborate (87). That is, swa_{def} and swa_{abs} perform the semantic functions argued for in section 3, *modulo* the independently motivated switch from *max* to *max-inf*. The interpretations of the more complex structures in this section arise from *swa*'s interaction with the semantic mechanisms in their surrounding structures. Compositional semantic analysis of equatives, in particular, has been instructive because it clarifies the semantic role of each of the several *swa*s they contain. In the correlative structural form of OE equatives with three *swa*s, the two individually attested kinds of *swa* cooccur and work together to produce the equative meaning. The resulting generality lends further support to the proposal in (5)/(87).

5. Summary and Outlook

5.1. Summary

The goal of this paper has been to develop a comprehensive picture of the semantic contribution of OE *swa*. A small corpus survey has collected a range of sentence types in which *swa* occurs. Compositional semantic analysis has identified two basic semantic contributions of the item itself: predicate abstraction and definiteness marking. Relative clauses introduced by *swa*, subordinate manner clauses and (three *swa*) equatives employ *swa* as a marker of predicate abstraction. Pronominal uses, equatives, uses as a conditional marker and as a consecutive marker showcase definite *swa*.

Definite *swa* is argued to be an instance of the operator *max-inf*. The interpretation of consecutives—not just in OE but in general—can be taken as further support for *max-inf* in the analysis of definiteness.

Aligning definiteness in the nominal domain with other semantic types invites a shift of perspective. What we tend to think of as a word, e.g. *she*, has been argued to have a much more elaborate analysis, roughly (88a) (see again Elbourne 2013; Patel-Grosz & Grosz 2017 for recent discussion, and references therein). The analysis of the degree pronoun *swa* (88b) is parallel. In both cases we see an indirect mapping between overt morphology and compositional ingredients. Definiteness is to be seen as a head or a feature on a head in both instances.

(88) a. she: [DP [D’ D *def* [NP P_4]]]

b. swa_{def} : [DegP [Deg’ Deg *def* [AP D_7]]]

How *def* is spelled out depends on semantic type. From what we have seen in this paper, it seems that type $<e>$ has a dedicated morphosyntactic spell-out—for example *the* in PDE DPs. *Swa* by comparison is more type flexible. This could be analysed as a default that is used in the absence of a dedicated option. Abstractor *swa* invites a similar perspective: Type $<e,t>$ relative clauses in OE generally employ a dedicated relative pronoun, e.g. *se*. *Swa*, again, is type flexible, yielding $<d,t>$, $<<v,t>,t>$ and so on, which could be seen as a default, generally available option. Structures with Predicate Abstraction show why I phrase the issue in terms of type, not category: the subordinate clauses concerned would all generally be analysed as CPs.

If these ideas prove useful, they invite an analysis of the morphosyntactic marking of fundamental semantic operations like *def* informed by semantic type.[3]

This analysis also invites relating an investigation of the fine grained morphosyntax and its mapping to meaning in the domain of pronouns of type $<e>$ to those of other types; e.g. extending the investigation in Patel-Grosz & Grosz (2017) regarding strong and weak definites, overt and empty pronouns, and crosslinguistic comparison. For example, is *swa* a strong definite?

These issues will be left for future research. In the next subsection, we take a brief look at some interesting instances of *swa* in OE that occur in the empirical survey but have not yet been discussed. In subsection 5.3 I explore how the proposals developed here allow us to connect the two types of *swa* in (87).

5.2. Possible extensions

This subsection examines the remaining data types found in the corpus study: Free Choice relative clauses (FCRs), apparent coordinating uses and apparent comparative conditionals. While they all merit a detailed discussion, I will keep the focus on the overall plot of this paper and limit myself to showing that these uses may well be compatible with my approach to OE *swa*.

Beginning with apparent comparative conditionals, remember (27) from section 2. The example is translated as a comparative *the* … *the* … construction (so-called comparative conditionals).

[3] I come back to footnote 1 here, which made a connection to Partee’s type shifts Lift and Lower. Her early analysis underlines the generality of the basic semantic operations that *swa* marks. The connection between morphosyntactic marking and semantic type that I point out here is more easily made when the morphosyntactic exponents of the operations are structurally represented - i.e. not in terms of type shifts.

(27)

Sua	micle	he	mæg	ieð	his	hieremenn	geteon	to	beteran,	&
so	much	he	may	easier	his	subjects	bring	to	better	&
he	bið	**sua**	micle	sel	gehiered	**sua**	he	ufor	gestent	
he	is	so	much	better	heard	so	he	higher	stands	
on	his	lifes	geearnungum.							
in	his	life’s	merits							

(cocura,CP:14.81.16.532)
‘He can the more easily improve his disciples, and the better he will be heard, the higher he stands in his life’s merits.’ (Sweet)

I suggest that we actually see an equative with the equative semantics targeting the difference degree argument slot of comparative adjectives (cf. Stechow 1984; Beck (2011). (90) spells this out for the simplified (89) (see e.g. Beck 2012a for such a semantics of comparative conditionals). Thus the example can be subsumed under equative uses of *swa*, where *swa* marks definiteness.

(89) *Swa* he stands higher, *swa* much better he will be heard.
‘The higher he stands, the better will he be heard.’

(90) (ιd: how well he will be heard at end(e) $\geq$ d + how well he will be heard at begin(e)) $\geq$ (ιd’: how high he stands at end(e) $\geq$ d’ + how high he stands at begin(e))
‘The difference between how well he will be heard at the beginning and at the end is at least as much as the difference between how high he stands at the beginning and at the end.’

Turning next to apparent coordinators, I pursue a similar idea. The actual example (26) is repeated below and a simpler prototype given in (91).

(26)

& geðence	he	simle	sie	**sua**	æðele	**sua**	unæðele	suæðer	he	sie	ða
& think	he	always	be	so	noble	so	common	whichever	he	be	the

æðelu	ðære	æfterran	acennesse,	ðæt	is on	ðæm	fulluhte,
nobility	the	afterwards	nativity	that	is in	the	baptism

(cocura,CP:14.85.14.552)
‘and whether he be noble or of low birth, let him ever consider the nobility of regeneration, which is in baptism,’ (Sweet)
‘… let him, noble **as** lowborn, consider …’

(91) *Swa* noble *swa* lowborn consider baptism.
‘Both the noble and the lowborn consider baptism.’
‘As the noble consider baptism, so do the lowborn.’

The suggestion I would like to advance is that these data are actually equatives as well. (92) offers a sketch of (91) as a property equative (parallel to (61)–(65) above). The conjunctive meaning emerges as an inference. If this is right, nothing new needs to be said about these occurrences of *swa*. This is attractive because an analysis of *swa* as an actual coordinator would require a rather different semantics (see e.g. Mitrovic & Sauerland 2014; 2016 for recent discussion).

(92) a. [CP [max-inf [CP $_{subord}$ swa1 the lowborn t_1 consider baptism]]
[CP $_{matrix}$ swa$_2$ IDENT [1[the noble t_1 consider baptism]]]]

b. The way that the lowborn consider baptism is the way that the noble consider baptism.
=> Both the noble and the lowborn consider baptism.

FCRs, finally, are not included in the analyses in the main sections of this paper because their compositional analysis requires a lot of background. OE FCRs and the role of *swa* in their semantics are discussed in Beck (in preparation; chapter 4). There, an analysis is developed that slots into the arguments presented in this paper. I offer a brief summary of that analysis here and refer the reader to Beck (in preparation) for background and details.

In (93a) I provide another example of an OE FCR (see also (25) in section 2). In (93b) I offer a specification of its truth conditions, following the analysis of such constructions in the recent literature (Rawlins 2013; Hirsch 2015; Demirok 2017).

(93) a

Sua	hwa	ðonne	**sua**	his	lif	to biesene	bið	oðrum	monnum	geset,	ne
so	who	then	so	his	life	to example	is	other	men	set	neg
sceal	he	no	ðæt	an	don	ðæt	he	ana	wacie,		
shall	he	not	that	one	do	that	he	alone	wake		

(cocura,CP:28.193.19.1293)
'Whoever, then, makes his life an example to others must not only himself keep awake,' (Sweet)

b. For all propositions p, p∈{if x sets his life as example then the person who sets his life as example must keep himself awake | x a person}: p is true.

According to this semantics, FCRs amount to a universal quantification over alternative propositions. The alternatives are introduced into the semantics by the interrogative wh-phrase (Hamblin 1973). FCRs include a conditional semantics. In order to illustrate what *swa* contributes, an LF for the simplified example in (94a) is provided in (94b). The LF includes a covert universal quantifier ALL which yields the meaning paraphrased in (93b).

(94) a. ^{i}*Swa* who ^{ii}*swa* sets his life as an example, he is awake.
'Whoever sets his life as an example, he is awake.'

b. [ALL [CP [CP$_{subordinate}$ ^{i}swa [$_{FCR\ clause}$ who ^{ii}swa1 [t_1 sets his life as an example]]]
[CP$_{matrix}$ he is awake]]]

According to this LF, the first occurrence of *swa*, ^{i}*swa*, is analysed as a conditional marker, concretely *max-inf*$_{<s,<,<s,t>,s>>}$, parallel to the conditional example (24) (c.f. (39), (40)). The second occurrence of *swa*, ^{ii}*swa1*, is analysed as marking Predicate Abstraction, parallel to the relative clause example (13), (c.f. (42)). See Beck (in preparation) for details and discussion. The point that is of interest in the context of the present paper is that both occurrences of *swa* are captured under the analysis proposed here: the first is *swa*$_{def}$ - *max-inf*, definiteness in the domain $<s>$; the second is *swa*$_{abs}$, a marker of Predicate Abstraction.

I conclude that the main proposals made in this paper can plausibly be extended to all data types that the corpus study has found.

5.3. Compositional semantic change—connecting the two swas

In this final subsection I examine the interesting ambiguity in (87). Why are these two apparently unrelated interpretations available for the lexical item? This question probably needs to be asked not just for OE *swa*, but for other languages as well, for example PDE *so* and *as* and Present Day German *so* 'so'. No doubt the reader has noticed that many, though not all uses of OE *swa* find a direct counterpart in *so* or *as* in PDE. See e.g. König & Vezzosi (2022) for relevant recent discussion. I conjecture that the ambiguity may well be more general.

I propose to relate the ambiguity to the trade-off between overt and covert marking of semantic operations. This point has come up above, e.g. when we investigated equatives with only one *swa* in the subordinate structure (83): is this *swa* a marker of definiteness or of PA? Since both can be covert, either option is plausible and in fact predicted. The question I would like to raise is whether this may help us to understand the vacuous structural ambiguity shown in (96), or in other words, to see a useful connection between the two *swa*s. What might fluctuate, in many contexts, is which bit of morphology is blamed for which semantic contribution—while the other semantic component required is assumed as a covert operator. The overall meaning is the same. The idea that a constant overall interpretation facilitates reanalysis of compositional ingredients is introduced as the concept of Constant Entailments in Beck (2012a) and Beck & Gergel (2015). Thus, reanalysis in one or the other direction between (96a) and (96b) should be easy. This may drive the range of uses of *swa*.

(96) *Swa* A is tall:

a. [swa$_{def}$ [1[A is t_1 tall]]] = max-inf(λd.Height(A) $\geq$ d) ***swa*: max-inf**

b. [max-inf [swa1 [A is t_1 tall]]] = max-inf(λd. Height(A) $\geq$ d) ***swa*: PA**

We find similar connections in the domain of individuals (type $<e>$): demonstratives and relative pronouns may be related (Patel-Grosz & Grosz 2017). (97) and (98) illustrate this point with examples from German and the determiner/relative pronoun *der*.

(97) a. Der Hund nieste. *der*: max-inf
the dog sneezed
'The dog sneezed.'

b. Fido, der allergisch ist, nieste. *der*: PA
Fido who allergic is sneezed
'Fido, who is allergic, sneezed.'

c. Der von Euch ohne Allergie ist, der werfe das erste Tempo.
the of you without allergy is that throw the first tissue
'Whoever among you is without allergies, let him throw the first tissue.'

(98) a. [CP der [1[t_1 von Euch ohne Allergie ist]]] ***der*: max-inf**

b. [CP max-inf [der1 [t_1 von Euch ohne Allergie ist]]] ***der*: PA**

(97a) exemplifies *der* as a marker of definiteness, *max-inf*. (97b) shows that *der* can mark Predicate Abstraction. Like the example with *swa* in (96), the example in (97c) can be reanalysed from (98a) to (98b) or vice versa, under observation of Constant Entailments. (Another example of a similar flexibility in the domain of pronouns is *de se* versus *de re* pronouns. *De se* pronouns have no meaning; their function is merely to indicate PA (Percus & Sauerland 2003a;b). They thus contrast with *de re* pronouns which are definites.) These observations invite us to understand the fluctuation between two abstract semantic contributions, predicate abstraction and definiteness, as a pathway of compositional semantic change.

In short, I propose that while no immediate semantic connection exists between the two contributions that *swa* can make, the connection can be made in terms of alternative correspondences between morphology and semantics—alternating compositional analyses leading to the same semantic result. This explains ambiguous *swa*.

Supplementary file

The additional file for this article can be found as follows:

- **Supplementary File.** Appendix. DOI: https://doi.org/10.16995/glossa.5755.s1

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The author has no competing interests to declare.

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