Underspecified modality in Washo*

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Abstract: In this paper I describe and analyze the semantic properties of the Washo modal verb *-eʔ*. The data show that this verb is underspecified for both modal force and modal flavor: it is compatible with both necessity and possibility claims, as well as epistemic and various root modalities. To account for this variability, I adopt the analysis of Rullmann et al. (2008) using modal choice functions, whereby the type of modal base is underspecified. The discussion is framed with an eye towards the semantic typology of both individual modal expressions, and modal systems as a whole.

Keywords: Washo, modality, underspecified modality, semantics, semantic typology, copula

1 Semantic typology of modal systems

The semantic typology of modals and modality systems has recently received much attention from researchers investigating understudied languages, and in particular languages of the Americas. Under the standard semantic analysis of modals as quantifiers over possible worlds (Kratzer 1977, 1981, 2012), there are two relevant parameters that determine the interpretation of a given modal: (a) *modal force*, whether the modal encodes a force of necessity (universal quantification over worlds) or possibility (existential quantification over worlds); and (b) *modal flavor* or type of modality, roughly the background against which a modal claim is made (e.g., epistemic, deontic, circumstantial). Generally in English, modal force is lexically specified, while modal flavor is contextually determined. For instance in (1a), *must* is compatible with an epistemic or deontic flavor, although it has a necessity interpretation across uses. Roughly, *all* worlds compatible with a body of evidence (epistemic) or with a set of rules (deontic) are such that Line is in her office in those worlds. Meanwhile in (1b), *may* is likewise compatible with an epistemic or deontic interpretation, but always has a possibility interpretation. That is, *some* worlds compatible with a body of evidence or set of rules are such that Line is in her office in those worlds.

(1) a. Line must be in her office.
→ epistemic (given what we know) or deontic (given the rules); necessity only

b. Line may be in her office.
→ epistemic or deontic; possibility only

Recent cross-linguistic work has shown that these parameter settings are subject to variation. For instance, Rullmann et al. (2008) have shown that in St'át'imcets (Salish), modal flavor is lexically specified, while modal force is determined contextually. For instance, the modal *ka* in (2) can be used to make either a necessity or possibility claim, but is always deontic.

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(2) lán-lhkacw **ka** áts'x-en ti kwtámts-sw-a
already-2SG.SUBJ DEON see-DIR DET husband-2SG.POSS-DET
'You must/can/may see your husband now.' (St'át'imcets; Rullmann et al. 2008:328)

Additionally, Vander Klok (2013) has shown that Paciran Javanese (Austronesian) has modals that are lexically specified for both force and flavor. For instance, *mesthi* in (3) is only compatible with epistemic necessity claims, while *oleh* in (4) is only compatible with deontic possibility claims.[1]

(3) a. Context: The math teacher says: "The ball is in box A or in box B or in box C. It is not in box A. It is not in box B. So…"

b. Bal-e **mesthi** neng C.
ball-DEF EPIST.NEC in C
'The ball must be in C.' (Javanese; Vander Klok 2013:352)

(4) a. Context: According to the rules of the hospital, only family members are allowed to enter the patient's room during visiting hours. You came to visit your sister, but it was after visiting hours. But the really nice nurse says…

b. Awakmu **oleh** melbu.
2SG DEONT.POSS enter
'You may come in. (Javanese; Vander Klok 2013:355)

Given this state of affairs, a typology of modals emerges as illustrated in Table 1. However, given that there are two relevant parameters of variation, there are four types of modals that are logically possible, although only three out of four boxes in the table are filled in. This raises the question: could there be modals that are underspecified for both force and flavor, leaving both up to context?

Table 1: Preliminary typology of modal distinctions

		Modal Flavor	
		specified	*contextual*
Modal Force	*specified*	Javanese (*mesthi*, *oleh*)	English (*must*, *may*)
	contextual	St'át'imcets (*ka*)	**?**

In this paper, I argue that the verb *-eʔ* in Washo (Hokan/isolate) is a modal that fills in the empty slot in the typology. I show that this verb is compatible with both necessity and possibility claims, across a range of modality types, thereby completing the typology in Table 1.

The rest of the paper is structured as follows. In Section 2, I provide some relevant background on the Washo language, and describe the morphosyntax of the modal construction. In Section 3 I show that the verb *-eʔ* is compatible with necessity and possibility claims with various modal flavors. I provide an analysis of *-eʔ* in Section 4 based on a modal choice function following Rullmann et al. (2008) for the variable force modals in St'át'imcets. In Section 5 I examine the

[1]Note that it is not the case that the whole modal system in Paciran Javanese is arranged in this way. For example, the modal *kudu* is a general root necessity modal; see Vander Klok (2013) for details.

interaction between *-eʔ* and negation, and in Section 6 I argue that *-eʔ* is a true modal rather than a marker of irrealis mood. Section 7 concludes.

2 Background on Washo *-eʔ*

Washo is an endangered language spoken in the area of Lake Tahoe in California and Nevada. It is classified as a language isolate within the hypothetical Hokan family (see Mithun 1999 for discussion). Neutral word order is SOV, although adjuncts can appear pre-or post-verbally (see Jacobsen 1964 and Bochnak 2013 for more details).

The verb *-eʔ* is a copula that can serve to predicate noun phrases or adpositional phrases of an individual-denoting subject. There are two distinct agreement patterns for copula constructions. One series of agreement follows the standard subject agreement for other vowel-initial verbs in the language; this is illustrated in (5) where the prefix *ʔ-* agrees with a third person subject. A second form of agreement is shown in (6), where the prefix *k'-* agrees with a third person subject. Bochnak et al. (2011) argue these agreement paradigms track whether the predicate is a stage-level or individual-level predicate.

(5) Tim lí:nuya ʔéʔi

Tim li:nu-a ʔ-eʔ-i
Tim Reno-LOC 3-COP-IPFV
'Tim is in Reno.' (stage-level predicate)

(6) t'é:liwhu dókto k'éʔi

t'e:liwhu dokto k'-eʔ-i
man doctor 3-COP-IPFV
'The man is a doctor.' (individual-level predicate)

The individual-level version of *-eʔ* also has a non-copula use where it has no overt subject and takes a subordinate clause as a complement. As I will show, sentences with this use of *-eʔ* receive a modal interpretation, whereby the subordinate clause serves as the prejacent proposition for the modal claim.[2] Subordination can syntactically be realized one of two ways. First, the modal use of *-eʔ* can embed a non-finite clause: the verb of the embedded clause is marked for subject agreement, but without a final temporal/aspectual suffix (e.g., *-i* 'imperfective' or *-aʔ* 'aorist'), which is obligatory in finite clauses. This is shown in (7), which has a generic interpretation.

(7) lí:nuya pú:luŋa deyéwamé:sha k'éʔi

li:nu-a pu:lul-ŋa de-yewam-e:s-ha k'-eʔ-i
Reno-LOC car-NC NMLZ-drive-NEG-CAUS 3-COP-IPFV
'He never drives to Reno.'

[2]Due to space constraints, I will assume familiarity with some technical terms from the modality literature, e.g., prejacent, modal base, ordering source. Readers are referred to von Fintel and Heim (2011) for a lucid introduction to this domain of semantics.

Second, the embedded clause can be a full clause (with a fully inflected verb form, including final temporal/aspectual morphology) that is marked by the relative clause suffix *-gi*, as shown in (8), which expresses future modality. This is the same relativizing morphology that is found in subject internally-headed relative clauses in the language (Jacobsen 1981). Note that (8) contains two instances of the verb *-eʔ*: the version in the embedded clause is the copula use (compare 5), and uses the "regular" agreement paradigm used for stage-level copula predications (first person = *le-*), while the matrix version of *-eʔ* contributes the modal interpretation, and uses the agreement paradigm found with individual-level copula predications (first person = *L-*).

(8) wát wútpɨda léʔgabigi Léʔi

wat	wutpɨd-a	le-eʔ-gab-i-gi	L-eʔ-i
tomorrow	Woodfords-LOC	1-COP-FUT-IPFV-REL	1-MOD-IPFV

'I will be in Woodfords tomorrow.'

Most often, the modal verb inflects for third person subject, regardless of the subject of the prejacent, but can also inflect for the same subject as the prejacent, as in (8). What conditions this alternation is not known. In cases where *-eʔ* is marked for a third person subject, but embeds an internally-headed relative clause with a non-third person subject, the switch reference marker *-š* appears on the embedded verb, as shown in (9), which has the reading of an ability modal.

(9) déʔek hádigi t'í:yeliʔ dibípɨsišgi k'éʔi

deʔeg	hadigi	t'-i:yel-iʔ	di-bips-i-š-gi	k'-eʔ-i
rock	that	NMLZ-big-ATTR	1-pick.up-IPFV-SR-REL	3-MOD-IPFV

'I can lift that big rock.'

3 A highly flexible modal verb

In this section, I provide a series of examples that shows that the modal use of *-eʔ* is compatible with necessity, weak necessity, and possibility claims, and is also compatible with a variety of modal flavors, including deontic, metaphysical, epistemic, bouletic, generic, and pure circumstantial.[3]

Deontic necessity (possible worlds that conform to a set of rules)

(10) a. Context: You borrowed a pot from Beverly, and now you need to give it back to her.

b. bévali wí:diʔ lé:šɨl k'éʔi

bevali	wi:diʔ	le-išɨl	k'-eʔ-i
Beverly	this	1-give	3-MOD-IPFV

'I need to give this to Beverly.'

[3]Many of the contexts used here are borrowed from or inspired by those found in Rullmann et al. (2008) and Deal (2011), or were elicited using the Totem Field Storyboards: www.totemfieldstoryboards.org.

(11) a. Context: A friend comes to visit, and brings her dog along. You don't want the dog to come in the house.

b. súku baŋáya ʔéʔišgi k'éʔi

suku baŋaya ʔ-eʔ-i-š-gi k'-eʔ-i
dog outside 3-COP-IPFV-SR-REL 3-MOD-IPFV
'The dog has to stay outside.'

Metaphysical/future necessity (possible worlds given a normal progression of time)

(12) a. Context: I ask you where you will spend the day tomorrow. You say:

b. wát wútpɨda léʔgabigi Léʔi

wat wutpid-a le-eʔ-gab-i-gi L-eʔ-i
tomorrow Woodfords-LOC 1-COP-FUT-IPFV-REL 1-MOD-IPFV
'I will be in Woodfords tomorrow.'

(13) a. Context: At a school dance, you wonder whether a shy boy will talk to a girl he likes. Your friend says "Yes,..."

b. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV
'The boy will talk to the girl.'

Epistemic necessity[4] (possible worlds consistent with a body of evidence)

(14) a. Context: You are planning to drive over the mountains. It's started to snow, and you know that whenever it snows, the road over the mountains is closed.

b. déʔešáŋawiš yéweš gumbeyéc'igigi k'éʔi

deʔeš-aŋaw-i-š yeweš gum-beyec'ig-i-gi k'-eʔ-i
snow-good-IPFV-SR road REFL-close-IPFV-REL 3-MOD-IPFV
'It's snowing a lot, so the road must be closed.'

Bouletic necessity (possible worlds that conform to one's desires)

(15) a. Context: You are at a restaurant, and the waiter says that today's special is fish, your favorite food. You say:

b. ʔát'abi léʔwigi Léʔi

ʔat'abi le-iʔiw-i-gi L-eʔ-i
fish 1-eat-IPFV-REL 1-MOD-IPFV
'I have to eat the fish!'

[4]The verb *-eʔ* does not often appear in epistemic contexts. In such contexts, speakers tend to use an evidential, or provide another paraphrase not using a modal. Nevertheless, the examples in (14) and (21) show that *-eʔ* is still compatible with epistemic modality, even though it is dispreferred.

Bouletic weak necessity

(16) a. Context: At a school dance, you tell your friend that a boy who is being shy should talk to a girl he likes.

b. mé:hu šáwlamhu wagayáŋaʔ k'éʔi

me:hu šawlamhu wagayaŋaʔ k'-eʔ-i
boy girl talk 3-MOD-IPFV
'The boy should talk to the girl.'

Generic (possible worlds where a certain property holds)

(17) lí:nuya pú:luŋa deyéwamé:sha k'éʔi

li:nu-a pu:lul-ŋa de-yewam-e:s-ha k'-eʔ-i
Reno-LOC car-NC NMLZ-drive-NEG-CAUS 3-COP-IPFV
'He never drives to Reno.'

Deontic possibility

(18) a. Context: Mary's friends come over to see if she is allowed to come out to play.

b. wádiŋ hé:š ʔump'áyt'igišuweʔ k'éʔi

wadiŋ he:š ʔum-p'ayt'i-giš-uweʔ k'-eʔ-i
now Q 2-play-along-hence 3-MOD-IPFV
'Now are you allowed to come play?'

(19) a. Context: At a school dance, you see a shy boy who wants to talk to a girl but isn't. You ask your friend if that boy is allowed to talk to that girl. Your friend responds: "Yes…"

b. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV
'The boy is allowed to talk to the girl.' = (13)

Future possibility

(20) a. Context: You have been working on building a house for quite a while now. I ask when you will be finished. You say it's possible you'll finish tomorrow.

b. wát didó:damamaʔišgi k'éʔi

wat di-do:da-mamaʔ-i-š-gi k'-eʔ-i
tomorrow 1-build-finish-IPFV-SR-REL 3-MOD-IPFV
'I might finish building it tomorrow.'

Epistemic possibility

(21) a. Context: You hear a knock at the door. You can't see who it is, but can see that the person looks about the same height as Beverly.

b. bévali k'éheligi k'éʔi

bevali k'-eʔ-hel-i-gi k'-eʔ-i
Beverly 3-COP-SUBJ-IPFV-REL 3-MOD-IPFV
'It might be Beverly.'

Circumstantial possibility (possible worlds that are consistent with a set of circumstances)

(22) a. Context: You see someone trying to pick up a very heavy rock. You are very strong, so you tell them that you can lift that rock.

b. déʔek hádigi t'í:yeliʔ dibípisišgi k'éʔi

deʔeg hadigi t'-i:yel-iʔ di-bips-i-š-gi k-eʔ-i
rock that NMLZ-big-ATTR 1-pick.up-IPFV-SR-REL 3-MOD-IPFV
'I can lift that big rock.'

(23) a. Context: You are discussing what could grow in the garden, given the type of soil.

b. dawpáp'ɨl ʔíʔmiʔaŋawigi k'éʔi wáʔ ŋáwaya

dawp'ap'ɨl ʔiʔimiʔ-aŋaw-i-gi k'-eʔ-i waʔ ŋawa-a
flower grow-good-IPFV-REL 3-MOD-IPFV here dirt-LOC
'Flowers could grow well here in this dirt.'

In sum, the Washo modal *-eʔ* is compatible with both necessity and possibility claims, and with a variety of modality types, indicating that it is not lexically specified for either modal force or flavor.

4 Analysis

The challenge now is to provide an analysis for modal *-eʔ* that can capture its flexibility with respect to both modal force and flavor. To do this, I follow Rullmann et al. (2008) in their analysis of modals in St'át'imcets. Recall that modals in St'át'imcets, while specified for flavor, show variable force. To capture this behavior, Rullmann et al. provide an analysis that makes use of a *choice function*. A choice function is a function that applies to a set and returns an individual from that set. Choice functions have figured prominently in the analysis of specific indefinites (e.g. Kratzer 1998; Matthewson 1999; Reinhart 1997). Rullmann et al. posit a *modal choice function*, which applies to a non-empty set of worlds, but instead of picking out a single world from that set, it returns a subset of worlds from that set. The formal definition of a modal choice function is given in (24).

(24) Modal choice function: A function f of type $\langle st, st\rangle$ is a modal choice function iff for any set of worlds W, $f(\mathrm{W}) \subseteq \mathrm{W}$ and $f(\mathrm{W}) \neq \emptyset$. (Rullmann et al. 2008:337)

The modal choice function operates over the set of worlds that is already restricted by a modal base (and ordering source)[5] in the sense of Kratzer (1981). The set of worlds returned by the choice function is then universally quantified over. That is, the modal asserts that in *all* the worlds chosen by the choice function, the prejacent proposition holds in those worlds. Rullmann et al.'s analysis of the St'át'imcets deontic modal *ka* is given in (25), where the specification of a deontic modal base is stated as a presupposition.

(25) $[\![\ ka\ ]\!]^{c,w}$ is only defined if c provides a deontic modal base B. If defined,
$[\![\ ka\ ]\!]^{c,w} = \lambda f_{\langle st,st\rangle} \lambda p_{\langle s,t\rangle}.\forall w'[w' \in f(B(w)) \rightarrow p(w')]$ (Rullmann et al. 2008:340)

Under this analysis, variable force is derived from the size of the set of worlds picked out by the choice function. The smaller the subset of worlds chosen, the weaker the modal force. In the case where the choice function is an identity function, the entire set of worlds in the modal base is universally quantified over, resulting in a necessity interpretation. In the case where the choice function returns a proper subset of worlds in the modal base, the result is a possibility interpretation.

While Washo *-eʔ* and St'át'imcets modals both display variable force behavior, the difference between them is that Washo *-eʔ* is not specified for any particular modal flavor. We can thus adopt the analysis for St'át'imcets modals to take care of the variable force, but only specify that the context provide *some* modal base, without specifying what type of modal base it is. We can therefore model the semantics of Washo *-eʔ* as in (26).

(26) $[\![$ *-eʔ* $]\!]^{c,w}$ is only defined if c provides a modal base B (which is also restricted by an ordering source). If defined,
$[\![$ *-eʔ* $]\!]^{c,w} = \lambda f_{\langle st,st\rangle} \lambda p_{\langle s,t\rangle}.\forall w'[w' \in f(B(w)) \rightarrow p(w')]$

Let me illustrate how the analysis works for the Washo sentence (13) = (19), repeated as (27), which as we have seen is compatible with metaphysical necessity and deontic possibility claims.

(27) a. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV

b. 'The boy will talk to the girl.'

c. 'The boy is allowed to talk to the girl.'

To get the interpretation in (27b), the modal base and ordering source derive a set of worlds metaphysically accessible from the actual world. The choice function is then the identity function over those worlds. That set of worlds is then universally quantified over to arrive at a necessity interpretation. To get the interpretation in (27c), the modal base and ordering source derive a set of worlds where the relevant rules in the actual world are obeyed. The choice function then picks

[5] Rullmann et al. collapse the separate contributions of the modal base and ordering source, and only talk about the modal base.

a proper subset of those worlds, which is then universally quantified over, yielding a possibility interpretation.

Both cases could be paraphrased in the following way: "In all the worlds chosen by the choice function, the boy talks to the girl in those worlds." The difference between the two interpretations, though, lies in the type of modal base (and ordering source), and the size of the subset of worlds chosen by the choice function. If the choice function is the identity function, we get a necessity interpretation; if the choice function picks out a proper subset, we get a weaker, possibility interpretation.

This style of analysis thus captures the variable force behavior of the Washo modal *-eʔ* as desired. However, I will point out an interesting consequence that arises from this analysis, namely that it uniformly involves *universal quantification* over a set of worlds. That is, the modal itself isn't actually underspecified for quantificational force – the effect of variable force comes from the size of the set quantified over, which is regulated by a modal choice function. We will return to this issue in Section 7 when we reconsider the semantic typology of modals.

5 Interaction with negation

There is another analysis for variable force modality on the market which I haven't considered here, namely that of Deal (2011) for the Nez Perce root modal *-o'qa*. What Deal observes is that *-o'qa* only has a variable force interpretation in upward-entailing environments. Meanwhile in downward-entailing environments only a possibility reading is available; witness (28) vs. (29).

(28) a. Context: A friend is preparing for a camping trip. I am taking this person around my camping supplies and suggesting appropriate things. I hand them two blankets and say:

b. 'inehne-**no'qa** 'ee kii lepit cickan
take-MOD you DEM two blanket
'You can take these two blankets.'
'You should take these two blankets.' (Nez Perce; Deal 2011:561)

(29) a. Context: You are explaining to someone who thinks they have to leave that they are not in fact required to do so. It's not necessary for them to leave.

b. # weet'u 'ee kiy'-**o'qa**
not you go-MOD
Consultant: "That's a different conversation, not this one. You're just saying *weet'u 'ee kiyo'qa*, 'you can't go'." (Nez Perce; Deal 2011:574)

Deal proposes that Nez Perce *-o'qa* is actually only a possibility modal; however, it is compatible with necessity force in upward entailing environments because of a lack of a necessity modal that would otherwise give rise to a scalar implicature. Deal draws an apt comparison to English quantifiers *some* and *all*. The use of *some* in upward entailing environments normally gives rise to a scalar implicature *but not all*. The generation of this implicature crucially relies on the existence of the stronger *all* that forms a scale with *some*. In the absence of a stronger element on the scale, the use of the weaker element then generates no such implicature. This is what Deal proposes for *-o'qa*: it is a possibility modal with no necessity counterpart, and thus gives rise to apparent quantificational variability in upward-entailing environments. However, in downward-entailing environments,

the scalar relations are reversed: possibility is no longer compatible with necessity, so we would not expect variable force readings here.

To rule out such an analysis for Washo *-e?*, we should test the behavior of *-e?* in downward entailing environments as well. It turns out this test is difficult to apply in Washo, since *-e?* does not like to be embedded.[6] For instance, *-e?* seems to only be able to take wide scope with respect to negation. Negation can only appear within the prejacent clause; it cannot be marked on the modal itself, as shown in (30)–(34). In these environments, we still find the variable force behavior of the Washo modal *-e?*.

(30) a. Context: You see someone trying to pick up a very heavy rock, but they can't lift it. You are not very strong, so you say that you can't pick up the rock either.

b. dé?ek t'í:yeliŋa dibípisé:sišgi k'é?i

de?ek t'-i:yel-i?-ŋa di-bips-**e:s**-i-š-gi k'-e?-i
rock NMLZ-big-ATTR-NC 1-pick.up-**NEG**-IPFV-SR-REL 3-MOD-IPFV
'I can't pick up that big rock.' (circumstantial: □¬)

c. * de?ek t'-i:yel-i?-ŋa di-bips-i-š-gi k'-e?-**e:s**-i
rock NMLZ-big-ATTR-NC 1-pick.up-IPFV-SR-REL 3-MOD-**NEG**-IPFV

(31) a. Context: You have been working on building a house for quite a while now, and you still won't finish it by tomorrow.

b. wát didó:damama?e:sgabišgi k'é?i

wat di-do:da-mama?-**e:s**-gab-i-š-gi k'-e?-i
tomorrow 1-build-finish-**NEG**-FUT-IPFV-SR-REL 3-MOD-IPFV
'I won't finish building it tomorrow.' (metaphysical: □¬)

c. * wat di-do:da-mama?-gab-i-š-gi k'-e?-**e:s**-i
tomorrow 1-build-finish-FUT-IPFV-SR-REL 3-MOD-**NEG**-IPFV

(32) a. Context: Someone offers you some candy, but your doctor says you shouldn't eat candy.

b. demuc'úc'uŋa lé?wé:sigi Lé?i

demuc'uc'u-ŋa le-i?iw-**e:s**-i-gi L-e?-i
sweet-NC 1.eat-**NEG**-IPFV-REL 1-MOD-IPFV
'I shouldn't eat candy.' (deontic: □¬)

c. * demuc'uc'u-ŋa le-i?iw-i-gi L-e?-**e:s**-i
sweet-NC 1.eat-IPFV-REL 1-MOD-**NEG**-IPFV

[6] Rullmann et al. (2008) likewise find that the variable force modals in St'át'imcets cannot be embedded.

(33) a. Context: You have been working on building a house for quite a while now, and you're not sure if you'll finish it by tomorrow.

b. wát didóːdamamaʔéːsheligi Léʔi

wat di-doːda-mamaʔ-**eːs**-hel-i-gi L-eʔ-i
tomorrow 1-build-finish-**NEG**-SUBJ-IPFV-REL 1-MOD-IPFV
'I might not finish building it tomorrow.' (metaphysical: ◇¬)

c. * wat di-doːda-mamaʔ-hel-i-gi L-eʔ-**eːs**-i
tomorrow 1-build-finish-SUBJ-IPFV-REL 1-MOD-**NEG**-IPFV

(34) a. Context: We are discussing the weather for tomorrow. It might rain, but it might not.

b. wát háʔašéːsgabigi k'éʔi

wat haʔaš-**eːs**-gab-i-gi k'-eʔ-i
tomorrow rain-**NEG**-FUT-IPFV-REL 3-MOD-IPFV
'It might not rain tomorrow.' (metaphysical: ◇¬)

c. * wát háʔaš-gab-i-gi k'-éʔ-**eːs**-i
tomorrow rain-FUT-IPFV-REL 3-MOD-**NEG**-IPFV

The lack of embeddability of Washo *-eʔ* means that we can't yet rule out an analysis along the lines proposed by Deal for Nez Perce *-o'qa*. As for other downward-entailing environments (e.g., restriction of a universal quantifier, antecedent of a conditional), my preliminary investigations reveal that it is difficult to embed *-eʔ* in these environments as well, although I must leave a more detailed investigation to future work.

6 Not an irrealis marker

It has been observed that languages of the Americas tend to make use of a general realis/irrealis distinction, rather than making more fine-grained modal distinctions like English and other Indo-European languages do (Mithun 1999; Palmer 2006). Roughly speaking, irrealis is a category that tends to mark non-assertion, or that a proposition is unrealized in the actual world (Mithun 1999; Palmer 2006). Since I have shown that Washo *-eʔ* is quite underspecified for type and force of modality, it is conceivable that it could be analyzed as a marker of irrealis mood.

I suggest, however, that this is not the case, and that Washo *-eʔ* should be considered a modal alongside more familiar examples like English *must* and *may*. First, note that *-eʔ* is crucially absent in at least three environments where we might otherwise expect irrealis marking to occur: questions, negation, and imperatives (Palmer 2006).[7]

[7]There is some controversy as to whether to qualify as an irrealis marker, a form must appear in *all* environments where we expect it to occur given the semantic definition above. See Michael (2014) for discussion.

Questions:[8]

(35) géwe hé:š mí:giʔayt'iʔi

gewe he:š m-i:giʔ-ayt'iʔ-i
coyote Q 2-see-PLUPERF-IPFV
'Did you see a coyote?'

(36) dáŋal dedó:daʔ mášašé:she:ši

d-aŋal de-do:daʔ m-ašaš-e:s-he:š-i
D.POSS-house NMLZ-build 2-not.know-NEG-Q-IPFV
'Do you know anyone who builds houses?'

Negation:

(37) t'ánuŋa ʔí:biʔé:si

t'anu-ŋa ʔ-i:biʔ-e:s-i
person-NC 3-come-NEG-IPFV
'Nobody came.'

(38) géwe t'ánuŋa ʔiʔwé:si

gewe t'anu-ŋa ʔ-iʔiw-e:s-i
coyote person-NC 3-eat-NEG-IPFV
'The coyote didn't eat anybody.'

Imperatives:

(39) Lynda gemugá:gim

Lynda ge-muga:gim
Lynda IMPER-ask
'Ask Lynda!'

(40) háda ditóšaba gedulá:š

hada di-tošab-a ge-dule-a:š
there 1.POSS-bag-LOC IMPER-hand-be.in.something
'Get it (money) out of my bag there!'

Second, reality status marking is canonically realized as an inflectional category, often fused with other inflectional categories such as person and number (Palmer 2006). This is obviously not the case for Washo: *-eʔ* is itself a verb, which participates in the inflectional paradigms of verbs more generally in the language.

Thus, for these reasons, I conclude that Washo *-eʔ* is not a marker of irrealis mood, but rather falls squarely under the category of modals.

[8]It is not the case that *-eʔ* is banned from appearing in questions, but when it does, a modal interpretation obtains; cf. (18) above. Also note that irrealis marking in Nanti (Arawak) is absent in questions, a language which Michael (2014) claims behaves like a prototypical irrealis-marking language.

7 Conclusions

I have shown that the Washo modal *-e?* is lexically underspecified for both modal force and modal flavor. This discovery allows us to complete the semantic typology of modals in Table 2.

Table 2: Revised typology of modal distinctions

		Modal Flavor	
		specified	*contextual*
Modal Force	*specified*	Javanese (*mesthi*, *oleh*)	English (*must*, *may*)
	contextual	St'át'imcets (*ka*)	**Washo** (*-e?*)

Although the distinctions in Table 2 describe the empirical generalization that modal force is variable for Washo *-e?* (and the St'át'imcets modals), the analysis proposed in Section 4 following Rullmann et al. (2008) hard-wires universal quantification over worlds into the meaning of *-e?*. Likewise an analysis along the lines of Deal (2011) specifies existential quantification to account for variable-force behavior. Thus, under both styles of analysis, modal force is in fact always lexically specified, and some other mechanism must be posited for deriving the effect of variable force. The typological generalizations might thus be stated in another way, as suggested by Deal (2011): languages differ as to what types of modal quantifiers it makes use of. Some languages have both universal and existential quantification over worlds (English, Paciran Javanese), while others make use of only one type (Washo, St'át'imcets, Nez Perce). Within the latter group, some languages have only universal quantification (Washo, St'át'imcets), while others have only existential quantification (Nez Perce).[9] This state of affairs is summarized in Table 3, where we consider not just the quantificational force of particular modal expressions, but the way in which the modal system as a whole is organized in a language.

Table 3: Quantificational force in modal systems

Modal quantifiers available	$\forall, \exists$	$\forall$ only	$\exists$ only
Languages	English, Javanese	St'át'imcets, Washo	Nez Perce

I close with some speculations on the relation between the modal use of *-e?* and its use as an individual-level copula.[10] A striking similarity between these two functions is that both have been proposed to involve universal quantification over some sort of abstract entity. In this paper, I argued for an analysis of modal *-e?* in terms of universal quantification over possible worlds. Meanwhile, individual-level predication has been analyzed in terms of universal quantification over situations or events (e.g., Chierchia 1995), which was adopted in a previous analysis of individual-level use of the copula in Washo (Bochnak et al. 2011). It is my hope that future research will explore the relationship and connections between these two interpretations and possible historical and cross-linguistic relationships between copula clauses and modal interpretations.[11]

[9] Deal hedges on whether this is true for all modals in Nez Perce, or just root modality.

[10] Recall that *-e?* can also be used with stage-level predicates, but with a different agreement paradigm than the one used for the i-level and modal uses.

[11] Interestingly, Russian uses a form of the verb 'to be' (*by*) that Dobrushina (2010, 2013) analyzes as a subjunctive marker used to express wishes, necessities, optatives, or hypotheticals. Thanks to Katie Sardinha for pointing me to this literature.

Orthography and glossing conventions

All Washo data come from primary fieldwork unless otherwise noted. The orthography used for Washo examples is adapted from Jacobsen (1964), where most characters correspond with their IPA values, with the following exceptions: *c* = [t͡s]; *L* = [l̥]; *M* = [m̥]; *š* = [ʃ]; *y* = [j]. Acute accents over vowels represent stressed syllables. I use the following abbreviations in glosses: 1, 2, 3 = first, second, third person; AOR = aorist; ATTR = attributive; CAUS = causative; COP = copula; D.POSS = d-possessive; DEON = deontic; DEONT.POSS = deontic possibility; DEM = demonstrative; DET = determiner; DIR = direct; EPIST.NEC = epistemic necessity; FUT = future; IMPER = imperative; INCH = inchoative; INS.NMLZ = instrument nominalization; IPFV = imperfective; LOC = locative; MOD = modal; NC = negative concord; NEG = negation; NMLZ = nominalizer; PLUPERF = pluperfect; POSS = possessive; Q = question particle; REFL = reflexive; REL = subject relative clause marker; SBJ = subject; SG = singular; SR = switch reference; SUBJ = subjunctive.

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