

The expression of Strong and Weak Necessity in Igbo: A simplified degree-based approach

Natalia Krasikova¹, Malte Zimmermann², Peter R. Sutton²

[1] University of Tübingen, [2] University of Potsdam

This work was supported by the DFG (German Research Foundation) – Project Nos. 519109539, 552248395 and Priority Program 2392.

Overview

- > Igbo has two weak necessity modals: *ga* and *kwesi*; *ga* is stronger than *kwesi*.
- > *-riri* can strengthen both *ga* and *kwesi* to derive strong necessity modals.
- > Therefore Igbo exemplifies a crosslinguistically distinct pattern for expressing necessity.
- > We motivate and define a *modal degree semantics* for Igbo necessity modals derived from preferences over propositions in a Kratzerian ordering source.

Cross-linguistic variation

1. Different lexicalizations: English *must* vs. *should*.
2. Weak necessity derived morphologically from strong necessity:
 - Greek: strong nec. modal *prepi* + counterfactual morphology (von Fintel & Iatridou, 2008),
 - Javanese: strong nec. modal *kudu* + particle *-ne* (Vander Klok & Hohaus, 2020).
3. Underspecification: Afrikaans *moet* & Samoan *tatau* (Weingartz & Hohaus, 2024).

4. **Strengthening of weak/underspecified necessity:**
Igbo: weak/underspecified *kwesi* and *ga* + suffix *-riri* as a strengthener.

Igbo Necessity Modals

kwesi is the default weak necessity modal.

- (1) *I kwesi(-ri) i-ga.*
2SG KWESI(-rv) INF-go
'You should go.'

ga + *-riri* is the default strong necessity modal.

- (2) *I ga a ga-riri*
2SG GA PTCP go-RIRI
'You must go.'

However:

- > Although *ga* is also a future marker it is used as a necessity modal, even without *-riri*.
- > *kwesi* may also combine with *-riri*. (primarily colloquial) and is equivalent to *ga-riri*.
- > *ga* is stronger than *kwesi*:

- (3) *O bu-ghị sọsọ na Uche kwesi-ri i-nọ, Uche ga-a-nọ.*
3SG be-NEG only COMP Uche KWESI-rv INF-stay Uche GA-PTCP-stay
'It is not only that Uche should stay, Uche must stay.'
- (4) *#O bu-ghị sọsọ na Uche ga i-nọ, Uche kwesi-ri i-nọ.*
3SG be-NEG only COMP Uche GA INF-stay Uche KWESI-rv INF-stay
'It is not only that Uche will/must stay, Uche should stay.'

Furthermore *ga* and *kwesi* allow for different modal flavors (cf. Mucha et al., 2024)

Strength Flavor		<i>ga</i>	<i>ga-riri</i>	<i>kwesi</i>	<i>kwesi-riri</i>
Weak	Deontic	✓	#	✓	#
	Teleological	✓	#	✓	#
	Epistemic	✓	#	✓	#
Strong	Deontic	#	✓	#	✓
	Teleological	#/✓	✓	#/✓	✓
	Epistemic	✓	✓	#/✓	✓
	Circumstantial	✓	✓	✓	✓
Bouletic		✓	✓	✓	✓

Table 1. Igbo necessity modals by flavors and strength

Data

Strong Teleological Necessity

- (5) Your friend is asking how to get to the seaside. There is only one road to go to the seaside. You say: In order to get there, **you must/#will take that road.**
- a. *i ga i-so ụzọ a. ** c. *#i kwesi-ri i-so ụzọ a.*
2SG GA INF-pass road this 2SG KWESI-rv INF-pass road that
- b. *i ga e-so-riri ụzọ a.* d. *i kwesi-riri i-so ụzọ a.*
2SG GA PTCP-pass-RIRI road this 2SG KWESI-RIRI INF-pass road this

*NB. In other strong teleological contexts *kwesi* without *-riri*. is okay, but *ga* without *-riri* is not.

Weak Teleological Necessity

- (6) There are different ways to get to the shopping center. You can go by foot, by bus, or drive yourself. You are not sure how to go. Your friend advises you to get the bus because it is cheaper: In order to get there, **you should/#will take the bus.**
- a. *i ga i were ụgbọ=ala ga.* c. *i kwesi(-ri) i were ụgbọ=ala ga.*
2SG GA INF take vehicle go 2SG KWESI(-rv) INF take vehicle go
- b. *#i ga-riri i were ụgbọ=ala ga.* d. *#i kwesi-riri i were ụgbọ=ala ga.*
2SG GA-RIRI INF take vehicle go 2SG KWESI-RIRI INF take vehicle go

Conclusion and outlook

1. The Igbo modal data provide strong evidence for a degree-based analysis, which treats gradable adjectives and weak and strong necessity modals in parallel.
 2. The degree-based analysis directly extends to the intensional operator *chọ* 'want', which can also combine with *-riri* to express a maximal desire, (12).
 3. Since the Igbo counterpart of 'to know' *ma* can also combine with *-riri* to express absolute certainty, it seems as if the concept of knowledge is a graded notion, at least in Igbo, (13).
- (12) *A chọ-riri m i-ga ebe a.* (13) *A ma-riri m.*
1SG want-RIRI 1SG INF-go place this 1SG know-RIRI 1SG
'I really want to go there.' 'I really know.'

Kennedy, C. (1997). *Projecting the adjective*. Doctoral dissertation, University of California, Santa Cruz. Kratzer, A. (1981). The notional category of modality. In *Words, Worlds, and Contexts* (pp. 38–74). Kratzer, A. (1991). Modality. In *Semantics: An International Handbook of Contemporary Research* (pp. 639–650). Mucha, A., Amaechi, M., Whibley, F., & Uegaki, W. (2024). Future and the composition of modal meaning: The view from Igbo. *Proceedings of Sinn und Bedeutung*, 28, 647–665. Portner, P., & Rubinstein, A. (2014). Extreme and non-extreme deontic modals. In *Deontic Modals*. Vander Klok, J., & Hohaus, V. (2020). Weak necessity without weak possibility. *Semantics and Pragmatics*, 13(12). von Fintel, K., & Iatridou, S. (2008). How to say ought in foreign. In *Time and Modality* (pp. 115–141). Weingartz, S., & Hohaus, V. (2024). Variable modal strength in Afrikaans and Samoan. In *Proceedings of TripleA 10*.

Modal degrees via preferences in the ordering source

Modal base (live options): **The ordering source (teleological goals)**, the set of:

- > Go to Italy or Spain or Sweden o_1 : Go somewhere warm
- > Go by train or by plane o_2 : Have a low carbon footprint
- o_3 : Practice Italian

Kratzer (1981, 1991): The proposition *Go to Italy by train* is a teleological must in this model, since it makes all of the unordered propositions in the ordering source true.

Our proposal: Derive degrees from preference orderings over ordering source propositions:

o_1 : *Go somewhere warm* $\succsim$ o_2 : *Low carbon footprint* $\succsim$ o_3 : *Practice Italian* $\mapsto d_3 \geq d_2 \geq d_1$

- $d_3 = o_1$ go somewhere warm
- $d_2 = o_1 \wedge o_2$ go somewhere warm & have a low carbon footprint
- $d_1 = o_1 \wedge o_2 \wedge o_3$ go somewhere warm & have a low carbon footprint & practice Italian

> A proposition *p* is necessary relative to degree *d*, iff *p* is true in all worlds in *d*:

(7) $\Box_{d_n} p \leftrightarrow \forall w \in d_n. p(w)$ (since $d_1 \subseteq d_2 \subseteq d_3$, it follows that $d_3 \geq d_2 \geq d_1$)

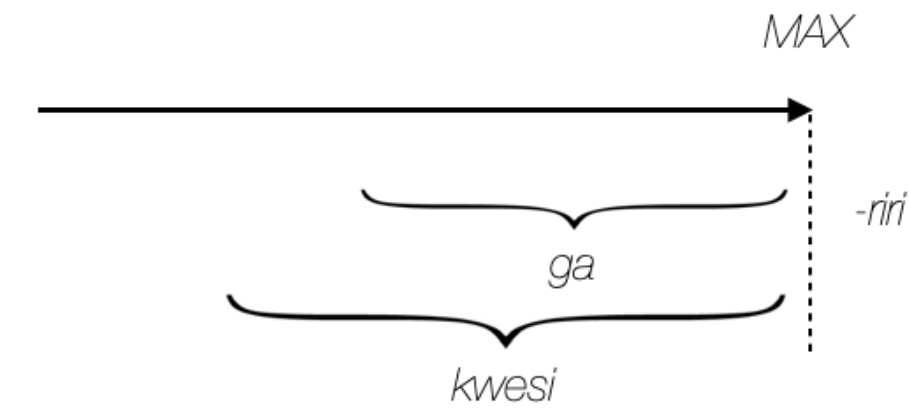
- Strong necessity** ($\Box_{d_3}$): We have to go to Italy or Spain.
- Weak necessity** ($\Box_{d_2}$): We should go to Italy or Spain by train.
- Weaker necessity** ($\Box_{d_1}$): Better would be to go to Italy by train.

Analysis: strong and weak necessity modals in Igbo

- In a nutshell:**
- > **Igbo necessity modals are gradable**
 - > ***ga* can be contextually stronger than *kwesi***
 - > ***-riri* is a degree maximizer**

Necessity modals *kwesi* and *ga*

- > *kwesi p*: *p* is necessary to some degree
- > *ga p*: *p* is necessary to a degree above a contextually specified threshold $\Delta_{O,c}$ (see, e.g., degree-based analyses of gradable adjectives)



> *d* argument can be existentially closed (akin to POS in Kennedy, 1997 for adjectives)

- (8) a. $\llbracket kwesi \rrbracket^{c,O} = \lambda d. \lambda p. \Box_d(p) \wedge d \in \Delta_{O,c}$
b. $\llbracket ga \rrbracket^{c,O} = \lambda d. \lambda p. \Box_d(p) \wedge d \in \Delta_{O,c} \wedge d \geq \Theta_c(\Delta_{O,c})$

Strengthening suffix *-riri*

> *-riri* fills the *d* argument with the maximal degree of necessity

- (9) a. *MAX* on a set of degrees: $MAX(\Delta_{O,c}) = id'. \forall d \in \Delta_{O,c}. d' \geq d$
b. $\llbracket -riri \rrbracket^{c,O} = \lambda P_{<d,<st,t>}. \lambda p. P(MAX(\Delta_{O,c}))(p)$
c. $\llbracket ga-riri \rrbracket^{c,O} = \lambda p. \Box_{MAX(\Delta_{O,c})}(p)$ (Trivially satisfied conjuncts suppressed)

Results

- > *ga/kwesi -riri*: only has a strong necessity reading.
- > Since *ga/kwesi -riri* is interpreted as the maximum point on the degree scale, no modification akin to *downright/absolutely must* in English is predicted.

The holiday example (assuming that context distinguishes *ga* as stronger than *kwesi*):

- (10) a. $\llbracket ga-riri \rrbracket^{c,O}(p) = \llbracket kwesi-riri \rrbracket^{c,O}(p) = \Box_{d_3}(p) = 1$ (for *p* = *go to Italy or Spain*)
b. $\llbracket \exists\text{-CL} \rrbracket(\llbracket ga \rrbracket^{c,O})(p) = \exists d. \Box_d(p) \wedge d \geq d_2 = 1$ (for *p* = *go to Italy or Spain by train*)
c. $\llbracket \exists\text{-CL} \rrbracket(\llbracket kwesi \rrbracket^{c,O})(p) = \exists d \in \{d_1, d_2, d_3\}. \Box_d(p) = 1$ (for *p* = *go to Italy by train*)

Other accounts

Mucha et al., 2024

- > Without *-riri*, *ga* is restricted to epistemic weak necessity: *ga p* is true iff *p* is true in all contextually accessible worlds that are normal/stereotypical: $p \supseteq ((\cap f) \cap (\cap NORM))$.
- > *-riri* replaces $\cap NORM$ with the identity function, *ga -riri* gives rise to a strong necessity reading: *ga -riri p* is true iff *p* is true in all epistemically accessible worlds ($\pm$ normal).

Predictions and problems:

- × *ga* (without *-riri*) unavailable or marked in non-epistemic flavours (e.g., bouletic).
- × *ga-riri p* should always, via anti-presupposition, be about non-normal worlds.

Portner & Rubinstein, 2014

> A degree-based Kratzerian modal semantics for English based on the following data:

- (11) a. Susan positively/flat-out/downright must / *should call her mother.
b. Susan very much *must / should call her mother.

Predictions and problems:

- × Igbo data do not compel us to treat strong necessity with *-riri* as extreme in the adjectival sense, i.e. extending a scale: once *-riri* is present, no further intensifier is possible.
- × does not link to the traditional box/diamond (universal vs. existential) semantics.
- × cannot derive the scalar structure from a single ordering source, which is crucial for Igbo data, where *ga* and *ga-riri* have the same strong reading in some contexts.

4. There is a suffix *-tu*, lit. *at least* that can further weaken necessity modals:

- (14) *Uche kwesi-ri i-kpọ-tu Adom. Uche kwesi-ri i-kpọ Kofi*
Uche **kwesi-rv** INF-call-**tu** Adom Uche **kwesi-rv** INF-call Kofi
'Uche kind of ought to call Adom. Uche should call Kofi.'
Comment: A stronger obligation to call Kofi than to call Adom.

5. Our MAX-based analysis could extend to DEF/MAX-based superlative adjective forms in Romance: *la mas hermosa* (the.F more beautiful.F, 'the most beautiful', Spanish).