

Fake tense in Hausa counterfactuals: A novel argument for underspecified EXCL*

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Abstract The paper presents a novel argument from Hausa (Chadic) for the analysis of counterfactual fake tense in terms of a lexically underspecified EXCL-operator (Iatridou 2000). Evidence comes from the facts (i.) that Hausa has no obligatory inflectional tense marking on the verb; and (ii.) that temporal anteriority and counterfactuality in Hausa are both expressed by a left-peripheral operator element with the segmental shape *daa*, which is then tonally disambiguated to temporal *dâa* and counterfactual *dàa*, respectively. The analysis is cast in von Prince’s (2019) modified branching-world model of counterfactuals.

Keywords: branching worlds, Chadic, counterfactuals, fake tense, Hausa, past tense, tenseless languages, understudied languages

1 Introduction

The phenomenon of fake tense, or fake past, is attested in various Western Indo-European languages, such as Greek or English. The main verb in the antecedent of counterfactual clauses appears to inflect for past tense, but without triggering a corresponding anteriority shift in the temporal domain, see (1):

(1) If Boris **listened** to the Scots (now), he would let them have a referendum.

Informally speaking, it appears that the obligatory finite *-ed* inflection on the verb can be used to express either a temporal shift away from the utterance time t_0 , to yield an anteriority reading (past), or else a modal shift away from Lewis’ (1986) actual world of evaluation w_0 (counterfactual fake past). The phenomenon has

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received quite some attention in philosophy and formal semantics, following early work in Dudman 1983 and Iatridou 2000, with formal accounts largely falling into two camps: *Past-as-past* accounts take the inflectional PST marking on the counterfactual verb at face value and have it denote temporal anteriority, as in all other instances. *Past-as-modal* accounts hold, first, that the finite PST inflection comes with a modal interpretation in counterfactuals, and, second, that the identity of anteriority and counterfactual marking reflects a lexical underspecification in the meaning of PST inflection (Iatridou 2000, Schulz 2014, von Prince 2019, i.a.). In Iatridou 2000, the PST inflection denotes an underspecified exclusion operator EXCL, which leads to temporal or modal shift depending on context.

This contribution presents a novel argument from Hausa (Chadic, Afro-Asiatic) for the analysis of counterfactual fake tense in terms of a lexically underspecified EXCL operator à la Iatridou (2000) and von Prince (2019). Hausa differs from English or Greek in that it has no tense inflection on the verb whatsoever, which makes it a grammatically tenseless language (Mucha 2013). As a result, analyses that build on the semantic vacuity of inflectional (pro)forms, such as Schulz's (2014), will not apply. Still, even grammatically tenseless Hausa exhibits fake past, namely in the form of a left-peripheral operator that has the same segmental shape *daa* in both its temporal and in its modal shifting use. This tonally underspecified segment *daa* will be analyzed as an overt instantiation of the lexically underspecified EXCL-operator. Tonal specification then resolves the underspecified meaning to temporal *dâa* and counterfactual *dàa* construals, respectively. The analysis is cast in a branching-world model with language-specific constraints on the lexical meaning of – what appear to be – past-operators; see von Prince 2019.

2 Fake past in tense-inflecting languages

The term fake past refers to the fact that natural languages can express counterfactuality by inflectional past marking on the verb. The following minimal pair from Iatridou (2000) illustrates for Modern Greek. Whereas present tense (or rather: non-past) inflection on the verbs in the antecedent and consequent marks the conditional clause in (2a) as an indicative metaphysical conditional over situations in the actual world, the two verbs in the counterfactual conditional in (2b) carry a PST inflection.

- (2) a. An **pari** afto to siropi θa **γῑini** kala.
 if take.NPST.PFV this syrup FUT become.NPST.PFV well
 ‘If he takes this syrup, he will get better.’
- b. An **eperne** afto to siropi θa **γῑinotan** kala.
 if take.PST.IPFV this syrup FUT become.PST.IPFV well
 ‘If he **took** this syrup, he would get better.’

The counterfactuals (CFs) in (3a-c) illustrate the same for English. In the three sentences, the antecedent verb carries PST morphology without a corresponding shift in the temporal domain: The CFs in (3a) and (3b) come with a present tense construal, as indicated by the temporal adverb *now*. The past CF in (3c) exhibits only a simple past shift instead of the double shift typically observed with periphrastic constructions consisting of past and perfect morphology.

- (3) a. If Cem **took** this syrup (**now**), he would get better. FLV
 b. If Cem **was** here (**now**), he would know the answer. PresCF
 c. If Cem **had taken** this syrup (**then**), he would be better. PastCF

The future-oriented CF in (3a) is also labelled a *future less vivid* (FLV) conditional. It has the same assertion as a run-of-the mill hypothetical conditional, but an additional implicature that “the actual world is more likely to become a $-p$ -world than a p -world” (Iatridou 2000: 234). Iatridou convincingly argues that FLV conditional clauses are present counterfactuals, too. The difference in interpretation follows from differences in verbal *Aktionsart*: CFs with telic VP-predicates, such as (3a), are interpreted as FLVs, whereas CFs with atelic VP-predicates denoting states or activities constitute present CFs. To see this, consider the atelic variant of (3a) in (4), in which the omission of the definite article induces an imperfective interpretation and the conditional is interpreted as a present CF.

- (5) If Cem **took** syrup, he would not cough. PresCF

Iatridou (2000: 245) concludes that “[...], FLVs, PresCFs, and PastCFs all contain a fake past. What is this fake past? There are, in principle, several ways to deal with a morpheme when it does not appear to be receiving its expected interpretation.”

Before turning to the different ways of analyzing fake past, let us observe that the phenomenon also shows up in complement clauses of the counterfactual attitude verb *wish*, thereby marking the content of the wish as counterfactual:

- (6) a. I wish I **had** a car (**now**/ *yesterday).
 b. I wish I **had had** a car (*now/ **yesterday**).

Iatridou (2000: 244) speculates that (6ab) may contain hidden CF conditionals, such that ‘A wishes that B’ would mean that ‘A thinks that if B, she would be happy (that B).’ This makes CF wishes another licensing environment for fake past.

3 Previous analyses of fake past: Past-as-past vs. past-as-modal

Existing formal accounts of fake past fall into two major classes. Next to backshifting approaches, which treat the PST inflection as denoting temporal anteriority across the board (past-as-past accounts, PAP), there are past-as-modal

accounts (PAM), which treat PST inflection on the verb as expressing temporal remoteness (anteriority) or modal remoteness (CF conditionals), respectively.

3.1 Past-as-past accounts: Temporal backshift in CFs

PAP-accounts originate in Dudman 1983, 1984 and are also found in Ippolito 2003, Arregui 2009, Grønn & von Stechow 2009, and Romero 2014, i.a. According to Dudman (1983, 1984), counterfactuals with so-called fake tense involve a genuine backshift in time, with a normal future indicative (metaphysical) conditional interpreted under a temporal past operator, which takes wide scope (7). In Ippolito's (2003: 60) terms, the metaphysical modal operator now quantifies over possible futures of the actual world relative to a certain contextually salient past time.

(7) **PAST** [MODAL_{METAPHY} [if FUT p] [then FUT g]]

PST inflection thereby uniformly expresses temporal precedence in counterfactuals and other indicative clauses alike, but the PST morphology may be interpreted outside the CF *if*-clause. The resulting mismatch between surface position and interpretation site is responsible for the fake tense-effect.

Romero (2014) offers a compositional PAP-analysis that treats tense inflection as denoting a temporally constrained variable with a double-access interpretation. In the case of CFs, the tense variable introduced by the CF past morphology is ultimately bound by a wide-scoping covert PAST-operator $\exists pro_1$ through the binding chain in (8). Details aside, the fake tense effect arises because the bound tense variable pro_6 induces no temporal shift: one of its specifications is locally $\lambda 5$ -bound, whereas the second is interpreted relative to the utterance time pro_0 .

(8) $\lambda 0[\exists_1[\mathbf{pro}_1^{[PASTpro_0]}[\lambda 2 \text{MOD}_{METAPHY} \mathbf{pro}_2$
 $[\lambda 3 \exists_4[\mathbf{pro}_4^{[FUTpro_3]}[\lambda 5 \exists_6[\mathbf{pro}_6^{[PASTpro_5],[mPASTpro_0]} \lambda 7 [\text{John come at } i_7]]]]]]$
 $[\lambda 3 \dots \text{CONSEQUENT} \dots]]]]$

On this account, PST morphology is locally interpreted in both antecedent and consequent clause of the counterfactual, at the cost of some formal complexity.

3.2 Past-as-modal accounts: Remoteness

PAM-accounts originate in Iatridou 2000, and are also found in Karawani & Zeijlstra 2013, Karawani 2014, Schulz 2014, and von Prince 2019, i.a. Iatridou (2000) proposes that the verbal PST inflection denotes a lexically underspecified exclusion operator over the temporal or the modal domain. Depending on context, PST is interpreted either temporally, such that the topic time excludes the utterance time t_0 , (9a). Or it is interpreted modally, giving rise to a counterfactual reading,

such that the topic worlds in the restriction of the universal modal quantifier exclude the actual world w_0 , (9b):

- (9) a. $\llbracket \text{Cem took the syrup} \rrbracket = 1$ iff $\text{take}(C, \lambda z.\text{syrup}(z), t_{\text{TOP}})$; iff $t_0 \notin t_{\text{TOP}}$
 b. $\llbracket \text{If Cem took the syrup, he would get better} \rrbracket = 1$ iff
 $\forall w \in W_{\text{TOP}} [\text{take}(C, \lambda z.\text{syrup}(z), w) \rightarrow \text{get_better}(C, w)]$; iff $w_0 \notin W_{\text{TOP}}$

On this account – which will provide the basis for the analysis of Hausa CFs to come – PST is a misnomer for the verbal inflection that is normally associated with temporal backshifting. Furthermore, although Iatridou (2000) is not concerned with compositionality per se, it appears possible to interpret the EXCL-operator denoted by PST in T or Mod. Finally, the double occurrence of PST in the antecedent and consequent of CF clauses is accounted for if exclusion is formulated as a constraint on possible value assignments to the local world variable w in (9b).

Iatridou's proposal faces a number of problems, some of which have been discussed in subsequent literature. First, the exclusion semantics in (9a) does not rule out evaluation relative to a future topic time, contrary to fact (von Prince 2019):

- (10) *Tomorrow, Cem **took** the syrup.

Iatridou (2000) tries to account for the ungrammaticality of (10) by restricting tense to range over past and present time intervals only, whereas future eventualities are expressed by a combination of modal shift and prospective aspect, as in Abusch 1985. But this does not answer the question of why contextually given topic times could not be located in the future. As a result, Iatridou (2000: 246, fn19) tentatively suggests to strengthen the exclusion semantics to a precedence semantics $<$, which may either be inapplicable or else vacuously satisfied in the modal CF case.

Second, Iatridou treats the respective contributions of PST inflection and the perfect participle in CFs on a par as operating in the tense domain (same as in most other formal treatments of fake past). However, it seems more appropriate to analyze the perfect as expressing aspectual information on the relation of ET and t_{TOP} (Klein 1994), namely $ET < t_{\text{TOP}}$, same as in non-counterfactual environments (Kratzer 1998, von Prince 2019). This is illustrated in (11) (Iatridou 2000: 252).

- (11) If Rembrandt had already married five times *by the time he was thirty*_{TOP}, we would have found traces of that in his self-portraits.
 PST: modal exclusion; participle: $ET_{\text{MARRYING}} < t_{\text{TOP}} (\dots < t_0)$

Third, the proposal does not account for past CFs with future orientation (Iatridou 2000: 252), i.e., Ogihara's (2000) *mismatched past subjunctive clauses*, as in (12); see also Ippolito 2003, 2013, Arregui 2007, and von Prince 2019.

- (12) If Hasiya had arrived tomorrow, she would have missed the concert.

Because of this, I will adopt the modified EXCL-analysis in von Prince (2019), in which the meaning of EXCL may be subject to further cross-linguistic variation.

Schulz (2014) offers an explicit compositional PAM-analysis that derives the semantic flexibility of the PST inflection from a structural ambiguity. Similar to Romero 2014, the PST inflectional morphology on counterfactual verbs is treated as a semantically vacuous form that is dependent on higher operators for semantic valuation. In Schulz 2014, the PST inflection comes with an uninterpretable feature [upast] which must be bound by a covert semantic operator and valued under feature transmission (von Stechow 2010). In particular, [upast] can be valued by a covert temporal PAST operator in T, (13a), or by the modal conditional quantifier $\Box R$, resulting in the CF (13b). The interpretable feature [ipast] in (13ab) receives a unified treatment in terms of precedence, (13c), as already hinted at in Iatridou 2000: “The modal past, i.e. the modal variant of the past tense operator, [...] expresses anteriority, but now in the epistemic domain” (Schulz 2014: 132).

- (13) a. temporal: Cem PAST_[ipast] took_[upast] the syrup
 b. modal CF: [[$\Box R$ _[ipast] [if Cem took_[upast] the syrup]] [q]]
 c. the feature [ipast] : $\lambda w \lambda \dots . X < E^* . OP(X)$

Crucially, the modal [ipast] in counterfactuals is not interpreted locally in Mood, but outside the *if*-clause, resulting in an asymmetry of temporal and modal [ipast], which Schulz (ibid.: 138) defends on empirical grounds. The non-local interpretation of modal [ipast] as well as the bound variable nature of PST inflection make Schulz’s (2014) account conceptually similar to Romero’s (2014) PAP-account. It will be seen shortly that the Hausa fake past data constitute evidence against both accounts, as these rely crucially on the presence of morphologically bound and semantically (near) vacuous proforms.

3.3 Hypothetical past vs present CF conditionals

All formal analyses capture the ambiguity of PST inflection in English conditional clauses between hypothetical past and present CF interpretations (Iatridou 2000). The ambiguity is typically resolved by temporal adverbials or contextual information and is not attested in tenseless languages with fake past, such as Hausa.

- (14) a. If Cem **took** the syrup (then), he will be better now. HypoPast
 b. If Cem **took** the syrup (**now**), he would be better soon. PresCF

4 A novel pattern: Fake past in grammatically tenseless Hausa

This section presents the central empirical observations on fake past in grammatically tenseless languages, such as Hausa. §4.1 shows that Hausa is

grammatically tenseless in the sense that there is no obligatory inflectional tense morphology on the verb, following Mucha 2013, 2015. §4.2 then shows that Hausa has an optional adverbial past tense marker *dâa* ‘formerly’, ‘back then’ in the left clausal periphery. Finally, the data presented in §4.3 show that the segmental skeleton *daa* is involved in marking both temporal past and counterfactuality. Hausa thereby exhibits fake past in the absence of inflectional tense morphology; see also Bohnemeyer (2018) for similar observations on tenseless Yucatec Maya.

Hausa is a Western Chadic language from the Afroasiatic phylum. It is mainly spoken in Northern Nigeria and Niger, with smaller sub-communities across all neighboring countries. The total number of speakers is estimated at more than 70 mio (www.ethnologue.com), which makes Hausa one of the most important indigenous languages of inland Sub-Saharan Africa. Hausa exhibits rigid SVO order and no case marking, but it allows for syntactic focus fronting (Newman 2000). Topical material is typically realized in sentence-initial position. Hausa has obligatory aspectual markers immediately preceding the verb.¹ Finally, it is a tone language with H, L (ˊ), and falling HL (ˆ) tones, which also mark grammatical distinctions concerning sentence type and aspect.

The data for this study are mostly taken from the existing literature on the formal properties of tense (non-) marking and counterfactuals (Newman 2000, Mucha 2013, 2015). Additional semantic judgments on individual counterfactual and tensed clauses were elicited via email from two native speaker linguists, one of them hailing from Sokoto (Nigeria) and one from the diaspora community in Accra (Ghana). Validation of these data with additional speakers is planned.

4.1 Hausa is grammatically tenseless

Mucha (2013, 2015) shows that Hausa is grammatically tenseless. There is no obligatory morphological coding of temporal information on V, nor in the extended verbal domain in T. As a result, the tenseless clauses in (15ab) can make reference to a past, present, or future topic time, depending on context (Mucha 2013: 381).

- (15) a. Ta-nàa wàasaa b. Sun gyaarà mootà-sà
 3SG.F.-IPFV play 3PL.PFV repair car-3SG.M.POSS
 ‘She is/was/will be playing.’ ‘They (have/will have) repaired his car.’

Mucha (2013, 2015) shows that, in the absence of context, PFV and IPFV aspect trigger default interpretations as present and past tense, respectively, in line with the general pragmatic resolution strategies in Smith & Erbaugh 2005. Future time reference is typically expressed by the future marker *záa*. Still, context can always

¹ I adopt Mucha’s (2013, 2015) analysis of Hausa PFV and IPFV aspect as essentially temporal. Perfective (PFV) and imperfective (IPFV) aspect express relations between event time and topic time (Klein 1994), with PFV including event time within topic time, and IPFV vice versa.

overwrite temporal reference in the absence of grammatical tense specifications. (16) from Mucha (2013: 387) shows that reference to a future topic time is contextually licensed in the absence of the future marker *zaa*.

- (16) Context: What will Bashir be doing when I come home tomorrow afternoon?
 Bashir ya-nàa wàasaa **gòobe**_{TOP}.
 Bashir 3SG.M-IPFV play tomorrow
 ‘Bashir will be /*was playing tomorrow (...when you come home).’

4.2 Optional tense marking in Hausa

In spite of its grammatical tenselessness, Hausa allows for the optional marking of past tense. Explicit reference to a past topic time can be made with the sentence-initial adverb *dâa* (Newman 2000: 35), which is realized with falling HL-tone and normally translated as ‘back then’ or ‘formerly’; see (17). *Dâa* is plausibly analyzed as a frame-setting past restrictor of Kleinian (1994) topic times. Its topic status is further evidenced by its frequent co-occurrence with the topic marker *maa*, as shown in (18) (from Newman & Newman 1979: 22):

- (17) **Dâa** i-nàa ciyar dà ìyaalli, ...
 PST 1SG-IPFV feeding P family
 ‘Formerly, I could provide for my family, ...’ (lit. ‘was feeding’)
- (18) **Dâa maa** naa san haká zâ-a yi.
 PST TOP IPFV know so FUT-3SG happen
 ‘I knew beforehand that this would happen.’ (lit. ‘that one would do so’)

This observation is relevant since left-peripheral topical elements typically have semantic content, unlike the bound inflectional tense preforms in Schulz 2014 and Romero 2014. If the overt optional tense marker *dâa* were bound by a higher covert PAST operator, as in these accounts, there would actually be two elements in the left-periphery, one semantically active and covert and the other semantically inactive and overt, (19). But why assume an additional covert operator if *dâa* is already in the right structural position to do the job?

- (19) * $\emptyset_{\text{PAST}i}$ [TOP *dâa*_{past,i} [TP ...]]

4.3 Conditional clauses and fake tense in Hausa counterfactuals

Indicative metaphysical conditionals in Hausa feature the obligatory COMP-head *idan/in*: (Newman 2000: 126).

- (20) **In** yâaraa **sun** daawoo zâ-n baa sù kwabòo kwabòo.
 if children 3PL.PFV return FUT-1SG give 3PL penny penny

‘If the children come back, I will give them a penny each.’

Interestingly, the telic perfective aspect of (20) does not trigger a default hypothetical past interpretation, unlike in matrix clauses, but it gives rise to a future-near-vivid interpretation (Iatridou 2000). Kaufmann (2005) has argued that indicative metaphysical conditionals have a future orientation even in the absence of overt *will* or *zaa*. It is therefore possible that this future orientation is built into the meaning of the conditional complementizer *in/idán* in Hausa. As a result, PFV aspect in (20) will locate the event time inside a future evaluation time. Finally, hypothetical past conditionals, cf. English (14a), are expressed with the temporal past marker *dàa*, as shown in the elicited clause in (21):

- (21) In **dâa** yâaraa sun daawoo zâ-n baa sù kwabòo kwabòo.
 if PST children 3PL.PFV return FUT-1 give 3PL penny penny
 ‘If the kids have already come back, I will give them a penny each.’

Turning to Hausa counterfactuals, these must be marked by L-toned *dàa* in the left periphery of antecedent and consequent. *Dàa* is optionally accompanied by the complementizer *in*. Out of context, present and past CF construals are distinguished by aspect, same as in declarative main clauses. Imperfective (22a) receives a default present interpretation, whereas perfective (22b) is interpreted as past.² (22c) shows that CF marking is also compatible with future marking, resulting in a FLV-interpretation (Iatridou 2000); all examples are taken from Newman (2000: 127).

- (22) a. (In) **dàa** su-nàa fad’aa, **dàa** mu-nàa jîn iihùu.
 if CF 3PL.IPFV fighting CF 1PL-IPFV hearing shouts
 ‘If they were fighting, we would be hearing shouts.’ **PresCF**
- b. (In) **dàa** kun ci wannàn ganyee, **dàa** kun mutù.
 if CF 2PL.PFV eat this leaf CF 2PL.PFV die
 ‘If you had eaten these leaves you would have died.’ **PastCF**
- c. **Dàa** zaa sù zàab’ee shì **dàa** zâ-i cùucee sùu.
 CF FUT 3PL elect 3SG CF FUT-3SG.M cheat 3PL
 ‘If they were to elect/elected him, he would cheat them.’ **FLV**

Setting the semantic contribution of (modalized) aspect aside, we thus find that the temporal orientation of Hausa CFs is largely determined by aspect, same as in English. Unlike in English, though, Hausa CFs with telic PFV-predications do not get a default interpretation as FLV, but as past CF, (22b). Also, while FLV-interpretations typically require the future marker *záa* or potential aspect in the antecedent, there are exceptions with perfective aspect (Newman: 127f.):

² Vesela Simeonova points out that (22a) should also allow for a past imperfective interpretation when the local reference time t_{TOP} is contextually shifted to the past: ‘If they had been fighting (at the topic time), we would have been hearing shouts’. I will leave this matter for future investigation.

- (23) **Dàa** kaa sàamifâm dubuu hàmsin **dàa** zaa-kà sàyi Marsandí?
 CF 2SG.M.PFV get pound thousand 50 CF FUT- 2SG.M buy Mercedes
 ‘If you were to get £50.000 (which you are not), would you buy a Mercedes?’

In other cases, the combination of CF marking plus perfective aspect also allows for a past CF with a future orientation; see the elicited (24) and English (12) above.

- (24) CONTEXT: Ablá taa daawoo jiyà, ... / ‘Ablá returned yesterday...’
 In **dàa** gòobe ta daawoo ne, **dàa** taa rasà konseti nnàn
 if CF tomorrow 3SG.F.PFV return FOC CF 3SG.F.PFV miss concert DEM
 ‘Had she (only) returned tomorrow, she would have missed the concert.’

Notice incidentally that (24) features syntactic focus fronting of the temporal adjunct *gòobe*, suggesting that the notion of contrast does indeed play a crucial role in the interpretation of such future-oriented past CFs; see Ogihara 2000, Ippolito 2003. Finally, counterfactual wishing is also expressed with *dàa* (Newman 2000), namely in the form of a truncated conditional optative (Biezma 2011); see (25) from Newman 2000. The use of the truncated conditional follows from the fact that the embedding attitude verb *sô* ‘wish’ selects for infinitival clauses only.³

- (25) **Dàa** maa i-nàa dá mootàa nee (Newman 2000: 128)
 CF TOP 1SG-IPFV P car FOC/EXCL
 ‘If only I had a car.’

The optative interpretation of (25) is supported by the clause final focus particle *nee*, which Hartmann & Zimmermann 2007 analyze as an exclusive operator; see also Grosz 2013 on the role of exclusive particles in marking optatives and in CFs.

4.4 Summary and problems for earlier accounts

The facts presented show that Hausa differs from tensed languages in that there is no obligatory inflectional tense morphology on the verb. At the same time, Hausa is similar to English in exhibiting a formal parallel between the optional marking of past tense and the marking of CF-conditionals: In Hausa, the operator elements used in past- and CF marking share the same segmental skeleton. The fact that these elements occur in a left peripheral topic position suggests that it is these elements that contribute the relevant semantic content. This is consistent with Iatridou’s (2000) PAM-analysis of PST in terms of semantically underspecified EXCL.

³ Another syntactic environment licensing *dàa* is the syntactic complement of the (deontic) weak necessity modal *yaa kàmaatà* ‘it would be better’, ‘should’. Such weak necessity modals feature subjunctive/CF or past morphology in many languages (von Stechow & Iatridou 2008), and they have recently been analyzed in Yalcin (2016) as involving a counterfactual normality claim. Hence, the occurrence of *dàa* is not unexpected. Thanks to Frank Sode for raising this empirical issue!

In contrast, the Hausa facts pose a problem for the other analyses discussed in §2. The fact that *dàa* occurs in the antecedent *and* consequent clause of CF-conditionals constitutes evidence against locating the entire conditional in the scope of a single covert past operator; see Dudman 1983, 1984. Romero’s (2014) compositional PAP-version is based on the presence of inflectional morphology on the verb, which is semantically bound by a higher covert past operator. There are no such inflectional elements in Hausa, though. Instead, the temporal marker *dâa* and the CF-marker *dàa* appear to be left-peripheral operator elements with semantic content. A similar problem applies to the compositional PAM-account of Schulz 2014, which relies on the presence of semantically vacuous inflectional preforms in need of valuation by a higher covert operator. Again, temporal *dâa* is not an inflectional element, but grammatically optional, and it is the only interpretable temporal expression in indicative main clauses. Moreover, its presence or absence determines the semantic difference between hypothetical past conditionals, on the one hand, and future-oriented present counterfactual conditionals, on the other. This shows, once more, that *dâa* is semantically active. All in all, then, the Hausa facts seem best amenable to an EXCL-operator analysis à la Iatridou (2000), where EXCL is overtly expressed by *dâa* and *dàa*, respectively.

5 A branching-world analysis of fake past = EXCL

The formal parallels between optional past marking and CF marking in Hausa are neatly accounted for in von Prince’s (2019) revised version of Iatridou’s (2000) classic PAM-account in terms of EXCL operators. The analysis of *dâa/dàa* involves the following ingredients:

- It is cast in the branching-world paradigm of Prior 1957, 1967, and Thomason 1970, with evaluation indices consisting of world-time pairs. There is no separate treatment of times and worlds in semantic evaluation.
- Adopting von Prince’s (2019) 3D-modality, it involves a tri-partite distinction into actual, possible, and counterfactual indices.
- The CF/PAST skeleton *daa* without tonal specification is analyzed as a semantic operator inducing a shift of the evaluation index away from the actual index and its successors, corresponding to von Prince’s (2014) treatment of the English simple (inflectional) past (ESP).
- The exact domain of index shifting is resolved by overt tonal specification with HL and L tone, respectively, unlike in English.
- The analysis allows for cross-linguistic variation in the meaning of PAST and CF-operators (von Prince 2019), and thereby for cross-linguistic differences in the coding of past tense and CF, including the absence of fake past.

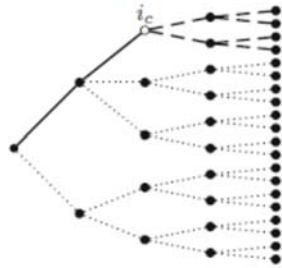


Figure 1 Branching Worlds
(von Prince 2019: 591)

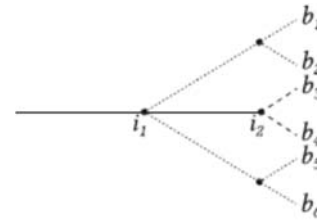


Figure 2 3D-modality
(von Prince 2019: 592)

5.1 Introducing branching worlds

In the branching-world models of Prior 1957, 1967, and Thomason 1970, time is taken as an absolute. Indices are time-world pairs, where simultaneous indices are vertically aligned in Fig.1. The actual index of utterance time and actual world $\langle t_c, w_c \rangle$ is singled out as i_c . *Branches* are maximal linearly ordered subsets on the set of indices I , where linear ordering corresponds to temporal precedence. Different branches, marked as solid, or dotted or dashed horizontal lines in Figs. 1 and 2, constitute different alternative histories, i.e., different ways in which the world could develop over time. The solid line leading up to i_c in Fig.1 constitutes the actual history consisting of actual past and the actual *now* index. The dashed lines single out actual future possibilities, i.e., the ways in which the actual world may develop after *now*, and the dotted lines indicate counterfactual possibilities, i.e., the ways in which the world might have developed otherwise. Unlike Thomason (1970), von Prince (2019: 591) also allows for quantification over worlds that are not identical up to i_c . The resulting three-way distinction into actual, possible future, and counterfactual indices, hence 3D-modality, is illustrated in Fig.2. The actual indices are i_2 and all predecessors of i_2 , including i_1 . The possible future indices are all successors of i_2 , i.e., b_3 and b_4 . And the counterfactual indices are neither predecessors nor successors of i_c , nor identical with it, i.e., b_1, b_2, b_5, b_6 , and the unlabelled indices vertically aligned with i_c . Von Prince's 2019 modified branching worlds thereby allow for a distinction between actual $\{b_3, b_4\}$ and counterfactual future possibilities $\{b_1, b_2, b_5, b_6\}$. This will be relevant for the analysis of (mismatched) past CFs with future time reference; see Ogihara 2000, Ippolito 2003.

5.2 The meaning of the English Simple Past and *would*

Against the background of 3D-branching worlds, von Prince (2019: 593) proposes the following meaning for the *English Simple Past* (ESP) inflection:

$$(26) \llbracket \text{ESP} \rrbracket = \lambda p_{\langle it \rangle}. \lambda i: i \in \text{TOP}_I, i \in \{ \{i' \mid i' < i_c\} \cup \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\} \}. p(i)$$

The simple past tense morphology of English thereby denotes a partial function over propositions p (sets of indices) that restricts the set of accessible evaluation indices i for p by adding a disjunctive presupposition. The propositional modifier ESP will only pick out those propositions that are true (i.) for topical indices that are predecessors of i_c on the actual branch (= actual past), or else (ii.) for topical indices that are located at times simultaneous or after the time of the actual index i_c , but not for possible successors of i_c or the actual index i_c (= counter-factual). In brief, ESP is a misnomer in that it does not restrict evaluation to past indices alone. Instead, it means anything but i_c or possible futures, which makes it a bona fide underspecified EXCL-operator ranging over both past and CF-indices, and nothing else. Notice that set union results in a flattening of the two index sets into a new set, which may be appropriate for English and the Oceanic language Dakaaka, in which past and irrealis sentences are also marked by the same morpheme (von Prince 2017). Finally, the past auxiliary *would* in the consequent clause of English CFs picks out all propositions that are true for indices that are located at times simultaneous to or after the time of the actual index i_c , but not for possible successors of i_c or i_c itself. The presupposition of *would* only consists of the second disjunct in (26), which singles out the set of counter-factual indices in present or future, corresponding to the Latin or German mood of *conjunctivus irrealis*:

$$(27) \llbracket \text{would} \rrbracket = \lambda p_{\langle it \rangle}. \lambda i: i \in \text{TOP}_I, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}. p(i)$$

Crucially, counterfactual indices in the past of i_c are neither in the denotation space of ESP nor of *would*. They require additional marking by perfect aspect in a past CF clause, such that perfect aspect introduces a new index i' preceding the topical index i (Kratzer 1998), which is constrained by ESP, (28b):

$$(28) \text{ a. } \llbracket \text{PERF} \rrbracket = \lambda p_{\langle it \rangle}. \lambda i. \exists i' [t(i') < t(i)] \wedge p(i')$$

b. PastCF: $t(i') <_{\text{PERF}} t(i_{\text{TOP}})$; defined iff $t(i_c) \leq t(i_{\text{TOP}}) \ \& \ \neg(i_c \leq (i_{\text{TOP}})) \text{ ESP}$

5.3 Extending the analysis to Hausa

The Hausa markers for past tense (*dâa*) and CF (*dàa*) share the same segmental skeleton, but they differ in tone. The core proposal is that the meaning of the skeletal core *daa* equals that of English ESP in (26). Tonal marking then results in a lexical specification in the semantic space of *daa* to temporal past or modal CF readings, respectively. Finally, grammatical and lexical aspect add information on temporal sequencing and in particular on the temporal positioning of the event index relative to the topic index, which is directly constrained by *dâa* and *dàa*.

(29ab) show the meaning of the surface forms *dâa* and *dàa*: the past meaning (29a) corresponds to the first disjunct in (26), and the CF meaning (29b) to the

second. We will return to the question of whether (29ab) can be derived from the flattened disjunctive ESP-meaning in (26), or whether a revision is called for.

- (29) a. $\llbracket \text{dâa}_{\text{past}} \rrbracket = \lambda p_{\langle i \rangle}. \lambda i: i \in \text{TOP}_i, i \in \{i' \mid i' < i_c\}. p(i)$
 b. $\llbracket \text{dâa}_{\text{CF}} \rrbracket = \lambda p_{\langle i \rangle}. \lambda i: i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}. p(i)$

With (29ab), the meaning of the basic examples in (17) and (22ab) is derived as follows. The topic index i of the declarative in (17), repeated, is shifted into the actual past with the optional past tense marker *dâa*. Imperfective aspect then locates the topic time $t(i)$ as fully contained inside the event time $t(i')$ of the speaker providing for the family:

- (17) **Dâa** i-nâa ciyar dà iyaalii, ... (Newman 2000: 35)
 PST 1SG-IPFV feeding P family

- (30) $\llbracket (17) \rrbracket = 1$ iff $\exists i' [I_feed_family(i') \wedge t(i) \subset t(i')]$, iff $i \in \text{TOP}_i, i \in \{i' \mid i' < i_c\}$
 = 1 iff there is a topical index i in the actual past (= preceding i_c) such that the speaker was providing for her family at i .

The interpretations of the present and past CFs in (22ab) are derived as follows. Since the CF-marker *dâa* is found both in the antecedent and the consequent clause, and in the absence of a modal *would*-auxiliary, I locate the quantificational force of CF in the (optional) complementizer *in*. Following von Prince (2019: 596, 26), the meaning of *in* is given in (31):

- (31) $\llbracket in \rrbracket = \lambda p_{\langle i \rangle}. \lambda q_{\langle i \rangle}. B_p \subseteq B_q$; where $B_\phi = \{b \mid b \in R_B, \exists i \in b. \phi(i)\}$ = the set of those contextually relevant branches that contain an index for which ϕ is true.

The modal universal quantifier *in* takes two propositions and states that the set of branches that contain an index verifying the antecedent p is a subset of the set of branches containing an index that verifies the consequent q . As a result, any index verifying p will be on a branch with an index verifying q . With (29b) and (31), the meaning of the present CF in (22a) is derived as in (32):

- (22) a. (In) **dâa** su-nâa fad'âa, dàa mu-nâa jîn iihùu.
 If CF 3PL-IPFV fighting CF 1CF-IPFV hearing shouts

- (32) a. $p = \lambda i: i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}. \exists i' [they\ fight\ at\ i' \wedge t(i) \subset t(i')]$
 b. $q = \lambda i: i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}. \exists i' [we\ hear\ shouts\ at\ i' \wedge t(i) \subset t(i')]$
 c. $\llbracket (22a) \rrbracket = 1$ iff $B_p \subseteq B_q$; defined iff $i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$

(22a) is thereby true iff the set of branches containing a CF-index verifying $\lambda i. \exists i' they\ fight\ at\ i', and\ t(i) \subset t(i')$ is a subset of the set of branches containing a CF-index verifying $\lambda i. \exists i' we\ hear\ shouts\ at\ i', and\ t(i) \subset t(i')$. That is, any branch containing a CF-index at which they are fighting (now) is a branch containing a

CF-index at which we would be hearing shouts (now). The meaning derivation for the past CF in (22b) is entirely parallel, as shown in (33).

(22) b. (in) **dàa** kun ci wannàn ganyee, **dàa** kun mutù.
if CF 2PL.PFV eat this leaf CF 2PL.PFV die

(33) a. $p = \lambda i: i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$.
 $\exists i' [\text{you eat leaves at } i' \wedge t(i') < t(i)]$
b. $q = \lambda i: i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$.
 $\exists i' [\text{you die at } i' \text{ and } t(i') < t(i)]$
c. $\llbracket(22b)\rrbracket = 1$ iff $B_p \subseteq B_q$ defined iff $i \in \text{TOP}_i, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$

(22b) is thereby true iff the set of branches containing a CF-index verifying $\lambda i. \exists i'$ *you eat these leaves at i' , and $t(i') < t(i)$* is a subset of the set of branches containing a CF-index verifying $\lambda i. \exists i'$ *you die at i' and $t(i') < t(i)$* . That is, any branch containing a CF-index at which the addressee ate these leaves before now is a branch containing a CF-index at which the addressee died before now. For simplicity, I gloss over differences between English-style PERF aspect in terms of temporal precedence and Hausa PFV aspect in terms of temporal inclusion, and simply treat Hausa PFV ($t(i') \subset t(i)$) as inducing a temporal backshift in CFs: $t(i') < t(i)$. It remains to be seen how this would square with Mucha's (2013, 2015) pragmatic account of default temporal backshifts with PFV à la Smith & Erbaugh 2005, which crucially relies on the instantaneousness of utterance time. Are counterfactual topical indices also instantaneous, then? Alternatively, the temporal backshift may be triggered by a covert PERF operator, which can also be overt. Interestingly, one consultant added the aspectual element *tun(i)* 'since, long ago' (Newman: 35) in elicited translation, see (34). The slot between aspect and V is reserved for functional elements. (34) is in need of additional validation, though!

(34) In **dàa** Binta **ta** (**tun**) sha magani nnan daazu, **dàa ta** (**tun**) gyi sawki.
if CF B. 3SG.F.PFV ASP drink medicine this then CF 3SG.PFV ASP recover
'If Binta had taken the medicine back then, she would have recovered.'

Finally, the analysis also accounts for past CFs with future reference (Ogihara 2000). (24) is true iff the set of branches containing a CF-index verifying $\lambda i. \exists i'$ *Abla returns at i' and $i' \subset i$ and i is tomorrow* is a subset of the set of branches with a CF-index verifying $\lambda i. \exists i'$ *Abla misses the concert in i' and $i' \subset i$ and i is tomorrow*. That is, any branch containing a CF-index at which Abla returns the day after is a branch containing a CF-index at which she misses the concert then.

(24) In **dàa** gòobe ta daawoo ne, **dàa** taa rasà konseti nnàn
if CF tomorrow 3SG.F.PFV return FOC CF 3SG.F.PFV miss concert DEM
'Had she (only) returned tomorrow, she would have missed the concert.'

- (35) a. $p = \lambda i: i \in \text{TOP}_1, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$.
 $\exists i' [\text{Abla returns at } i' \ \& \ t(i') \subset t(i) \ \& \ t(i) \in \text{tomorrow}]$
- b. $q = \lambda i: i \in \text{TOP}_1, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}_{\text{CF}}$.
 $\exists i' [\text{Abla misses concert at } i' \ \& \ t(i') \subset t(i) \ \& \ t(i) \in \text{tomorrow}]$
- c. $\llbracket (24) \rrbracket = 1$ iff $B_p \subseteq B_q$ defined iff $i \in \text{TOP}_1, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\}$

5.4 On tonal specification: a plea for structure in proposition disjunction

We still need to answer the question of how to derive the meanings of the disambiguated surface forms *dâa* and *dàa* in (29ab) from the underspecified disjunctive meaning of the skeletal core *daa* in (26). In a first attempt, the specific meanings in (29ab) may be derived by intersecting the set-union of indices in (26) with the more specific presuppositions of HL and L tone, respectively; see, e.g., Ippolito 2003 on intersecting presuppositions. Technically, this might work if the intonational meaning of HL and L were conceptualized as a presupposition-triggering modifier of type $\langle\langle it, it \rangle, \langle it, it \rangle\rangle$, as shown for HL tone in (36). In the course of applying (36) to (26) (= P), the individual presuppositions on possible index values are intersected, resulting in temporaö backshift.

- (36) $\llbracket \wedge \rrbracket = \lambda P_{\langle it, it \rangle} . \lambda p_{\langle it \rangle} . \lambda i: i \in \text{TOP}_1, i \in \{i' \mid i' < i_c\}. P(p)(i)$

However, this procedure requires postulating very specific meaning contributions for HL and L tone, which are not attested elsewhere in Hausa. Moreover, it would be at odds with other instances of tonal specification or disambiguation, which is a rather common feature of Hausa. For instance, the choice between HL and LH tonal pattern on the proximal demonstrative skeleton *wannan* in (37ab) determines whether the proximal center is the speaker or the addressee. With the spatial or temporal deictic adverb *nan*, tone disambiguates between proximal and distal meanings, (37cd) (Newman 2000: 36, 147).

- (37) a. *wannàn* ‘this (by me)’ b. *wànnan* ‘this (by you)’
 c. *nân* ‘here, now’ d. *nan* ‘there near you, then’

At the clause level, tonal specification determines the clause-type of canonical sentences as declarative (falling intonation) or interrogative (final rise); see Newman & Newman 1981, Leben et al. 1989. The widespread occurrence of tonal specification in Hausa, with different tone patterns and different semantic effects, constitutes a strong argument against the specific meaning assignment in (36). Rather, it seems that the unified function of tonal specification in Hausa is to indicate a choice from a binary set of alternative interpretations, where the exact pairing of tone and meaning is conventionalized to some degree. In some cases, the choice may be supported by iconic or other paralinguistic features, such as, e.g.,

with proximal and distal demonstratives, or with the rising tone of questions (Gussenhoven 2004). In view of these facts, I propose the revised meaning of the lexically underspecified skeleton *daa* in (38). (38) differs from (26) in that the two constraining index sets are not flattened by set union, but kept apart as two alternative presuppositional index sets. From these two alternatives, HL tone selects for the first and L tone for the second.

$$(38) \llbracket daa \rrbracket = \lambda p_{\langle it \rangle} . \lambda i : i \in TOP_i \wedge i \in ALT, \\ ALT \in \{ \{ i' \mid i' < ic \}, \{ i' \mid t(ic) \leq t(i'), \neg (ic \leq i') \} \}. p(i)$$

To conclude, whereas the flattened meaning specification in (26) may be sufficient to account for fake tense phenomena in English with fully identical surface realizations, (38) seems better suited for capturing the individual meaning contributions of underspecified *daa* and its surface realizations *dâa* and *dàa* in Hausa. Moreover, given that sets of indexes are propositions, the more richly articulated semantic structure in (38) provides another empirical argument for analyzing clausal conjunctions or disjunctions as denoting sets of distinct propositions (Kratzer 1977, 2012).

5.5 Further predictions

The analysis of fake past in Hausa makes several additional predictions. First, it correctly accounts for the disambiguating effect of optional temporal *dâa* in indicative metaphysical conditionals to yield a hypothetical past reading in (21). The meaning of the antecedent clause is shown in (39), where the temporal reference of the antecedent is backshifted relative to ic (= now). The non-ambiguity follows from the fact that temporal *dâa* cannot shift the evaluation to CF-indices.

$$(39) p = \lambda i : i \in TOP_i, i \in \{ i' \mid i' < ic \}. \exists i' \text{ children come back at } i' \text{ and } t(i') \subset t(i)$$

Secondly, *dàa* and *dâa* are modifiers of type $\langle it, it \rangle$ and do not change the type of their propositional complement. Hence, they should be able to co-occur in past counterfactuals. This prediction is also borne out, as shown in the elicited (40):

(40) In **dàa dâa** Binta taa sha maagàni nnàn d'`azu, **dâa dâa** taa yi sauk'`i
 if CF PST Binta 3F.PFV drink medicine DEF then CF PST 3SG.F.PFV do.relief
 'If Binta had taken the medicine back then, she would have been better.'

A precondition for such double occurrences is that ic is backshifted from the actual *here-now* to a local context index by fitting *dàa/dâa* with an additional ic -argument slot. This is comparable to the temporal backshift of t_{TOP} from utterance time to a local context time under embedding; see Ogihara 1995. With temporally backward-shifted CFs, such as (40), the counterfactual indices are determined relative to a local index ic , which is temporally backshifted against the utterance time index ic' .

- (41) a. $\llbracket \text{dâa}_{\text{PRÄT}} \text{Binta take medicine} \rrbracket = \lambda i_c: i_c \in \text{TOP}_I, i_c \in \{i' \mid i' < i_c\}$.
 $\exists i'' [\text{Binta takes medicine at } i'' \text{ and } t(i'') \subset t(i_c)]$
- b. $\llbracket \text{dâa}_{\text{CF}} \text{dâa}_{\text{PRÄT}} \text{Binta take medicine} \rrbracket = \lambda i: i \in \text{TOP}_I, i \in \{i' \mid t(i_c) \leq t(i'), \neg(i_c \leq i')\} \& i_c \in \{i' \mid i' < i_c\}$. $\exists i'' [\text{Binta takes medicine at } i'' \text{ and } t(i'') \subset t(i_c)]$

If correct, there may actually be two ways of accessing CF indices in the past in Hausa: through a combination of CF evaluated against the utterance time plus perfect aspect (with *tun(i)*), or through the combination of past *dâa* and CF *dâa*!

Finally, as the meaning contribution of *dâa* (and *dâa*) is presuppositional, it is invisible to negation (42) (elicited), and it cannot be made at-issue under focus. The contrasting elements *dâa* and *yànzù* in (43) from Newman (2000: 35) are not foci, but topics. And *dâa* is illicit as an at-issue fragment answer to a *when*-question, (44), in contrast to the at-issue adverbial *jìyà* ‘yesterday’. The facts suggest that *dâa* and *dâa* are presuppositional frame-setters for the topical evaluation index:

- (42) * **Baa dâa bá** (nee) na san haká zâa yi
 NEG PST NEG FOC 1SG.PFV know so FUT-3SG happen
 INTENDED: ‘I didn’t know before that this would happen (but only now).’
- (43) **dâa** i-nâa ciyar dà iyaalli, àmmaa yànzù dai, inâ!
 PST 1SG-IPFV feeding P family but now TOP no way
 ‘Formerly, I could provide for my family, but nowadays, no way!’
- (44) Q: Yaushe Musa ya dawo? A: Jiyà / *Dâa.
 when M. 3SG.M.PFV return yesterday PST
 ‘When did Musa return?’ ‘Yesterday.’ / # ‘Long ago.’

6 Conclusion

The paper presents a novel paradigm of fake past = EXCL in the grammatically tenseless language Hausa (Chadic): Unlike in Greek or English, past and counterfactual readings in Hausa are not expressed by possibly semantically inert inflectional morphology on V, but by a topical operator element *daa* in the left periphery. The formal analysis of *daa* as a general exclusion operator (Iatridou 2000) is cast in the modified branching-world model of von Prince (2019): The skeletal core *daa* comes with a lexically underspecified meaning that corresponds to the meaning of English Simple Past morphology in von Prince (2019), modulo a slight modification. The meaning of *daa* restricts evaluation to actual past or counterfactual indices. Tonal specification then results in the surface forms *dâa* (past) and *dâa* (CF), which function as not-at-issue frame-setters on the evaluation index *i*. Finally, other tenseless languages may also employ temporal-aspectual markers for expressing CF, such as, e.g., the temporal adverb *ka’ch* ‘formerly’ in tenseless Yucatan Maya (Bohnenmeyer 2018).

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