

Mirativity in Morphology

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Summary

Broadly defined, *mirativity* is the linguistic term often used to describe utterances that speakers use to express their surprise at some unexpected state, event, or activity they experience. As an illustration, imagine the following scenario: rain is an infrequent occurrence in the Arizona desert, and the news forecast predicts another typically long stretch of sunny weather. Wanda and her colleague are planning a hike in the mountains that afternoon. Aware of this prediction, and being familiar with the typical desert climate, they step outside into the pouring rain. This elicits the surprise of Wanda: based on the weather forecast and coupled with her background knowledge, the rain is an unexpected event. As such, Wanda has a number of linguistic options for expressing her surprise to her colleague in (1):

- (1) Wow, it's raining!
 It's raining!
 No way, it's raining?(!)
 I can't believe it's raining(!)
 I see it's raining(!)
 It looks like it's raining(!)
 Look at all this rain(!)

The utterances in (1) provide a sample of the diverse lexical and grammatical strategies a speaker of English has to express surprise at an unexpected event such as the one above; these include expressive particles such as *wow* and *no way*, surprised intonational contours (orthographically represented by the exclamation mark '!'), rhetorical questions (represented by '?'), expressions of disbelief, and evidential verbs such as *look* and *see*. (1) also shows that many of these strategies can be combined within the same utterance. Mirative utterances often have the function in conversation of drawing the attention of interlocutors to the surprising event, but they can be even uttered to oneself.

Many languages have dedicated morphology for expressing mirative meaning. For example, the declarative sentence in Chechen (North Caucasian) in (2a) is used to assert the proposition that Zara has come – an expected event that the speaker has (firsthand) knowledge of. In (2b) the mirative morpheme *-q* suffixes to the verb stem, which the speaker uses to express her surprise at the unexpected arrival of Zara (Molochieva 2007: 4):

- (2) a. Zaara j-iena
 Zara j-come.PERF
 'Zara has come.' [and she is still here; I expected her to come]
- b. Zaara j-iena-**q**
 Zara J-come.PERF-**MIR**
 'Zara has come!' [I didn't expect her to come]

The speaker's response in (2b) is described as one involving a sense of 'unexpectedness'. This shows that mirativity, as it is often defined, can cover responses that overlap with surprise (or at least what we translate as surprise), such as unexpectedness and sudden discovery. Likewise, many of the utterances in (1) may also emphasize one or more of these mirative meanings, even within the same utterance.

This article introduces the reader to the category of mirativity, with a focus on how mirativity is expressed through morphology. Since mirativity is a lesser-known linguistic category, both grammatically and semantically, the following sections provide some background on the origins of research on mirativity, how it is approached from a cross-linguistic and descriptive perspective. A review of the state-of-the-art on how mirativity is tested, analyzed, and explained from functional, historical, and theoretical perspectives is also presented, with the aim of identifying current questions for future research both in morphology and beyond.

Keywords

Evidentiality, surprise, psychology of language, deixis, implicature, illocutionary force

1. Background and perspective

Descriptions of mirativity, and phenomena that can be defined as mirativity (even if it's not labeled specifically as such) can be found in the language documentation literature going back decades. More recent research dedicated to examining mirativity as a *bone fide* linguistic category (as opposed to being a general label for a phenomenon) has shown that it is ubiquitous in language. To get a sense of scope of mirativity it might be useful to compare it other major linguistic categories found in natural language, such as *modality*. Modal meanings can be expressed through a myriad of different lexical categories and grammatical constructions, and at difference levels of meaning. In languages such as English modal meanings are encoded through auxiliary verbs such as *might* and *must*, but also attitude verbs (i.e. *think*), and modal adverbs such as *probably*, *maybe*, *definitely*, *possibly*, etc. In other languages modal meanings are expressed through tense, aspect, and grammatical evidentials. Mirativity involves a similar level of diversity in how it is manifested intra-linguistically, as (1) demonstrates, and cross-linguistically, as shown in this article. This comparison is also relevant in another way; just as modality is a semantic and linguistic universal, so too is mirativity: all languages have the linguistic means for expressing the surprise of the speaker. This claim is supported by the central place surprise (and related responses) has in revealing the psychological and cognitive processes that guide and help us make sense of the world around us. These observations taken together make mirativity an important area of study in not only linguistics, but also psychology and the cognitive sciences.

In the decade prior to the time of writing this article mirativity has become an intensely active area of research. As such, only relatively recently have we seen the emergence of research programs, articles, presentations, workshops, and theses devoted to investigating mirativity in all the major domains of linguistics, especially as the expression of surprise implicates phonology, morphology, syntax, semantics, and pragmatics. Interestingly, even a quick survey of this literature leaves one with the impression that the field seems to be still working out exactly what the term 'mirativity' is supposed to mean, and many open questions remain: is mirativity a linguistic, grammatical, or semantic category? Is it really about surprise, or should the coverage of the term be narrower or broader? Can the meanings covered by the term 'mirativity' be

derived from other kinds of meanings? How do we discover and test mirativity? What kind of theory can explain mirativity? The field has made major strides recently in putting the pieces of the mirativity puzzle together, but much research remains to be done to answer these questions.

1.1 Where does ‘mirativity’ come from?

Given its fairly specialized meaning, the roots of the history of mirativity are both fairly recent and relatively easy to trace. The term ‘mirativity’ can be traced to the descriptive traditions of the languages of the Balkans, where the term ‘admirative’ was used in (see Aikhenvald 2012, Friedman 2003, 2010, 2012, 2017 for a more extensive history of the term). Although the use of the term mirativity goes back decades in the language description and grammar writing literature, it is generally acknowledged that it was the landmark paper of Aksu-Koç and Slobin (1986) that put the term ‘mirativity’ on the map. Aksu-Koç and Slobin (1986: 159) describe and analyze the extended semantic uses of the Turkish evidential *-miş* in (3):

- (3) Kemal gel-*miş*
Kemal came-EVID
Evidential translation: ‘Kemal apparently came’
Mirative translation: ‘Kemal came!’

The verbal suffix *-miş* has been in many ways the ‘touchstone’ for mirativity; it has a storied history, and there is a plethora of research devoted to its analysis (see, for example, Temürçü 2007 and Hill 2012 for more history). The use of *-miş* in certain contexts can either express that the speaker has indirect evidence for Kemal’s arrival (perhaps seeing his coat hanging on the door, or a report of his arrival), or the speaker’s surprise at the sudden and unexpected arrival of Kemal. The latter of these is the mirative use of *-miş*, which Koç and Slobin (1986) describe as the linguistic manifestation of the ‘unprepared mind’ of the speaker, which hints at the intrinsically psychological character of mirativity.

DeLancey (1997, 2001) picked up on these observations and connected them to similar phenomena he observed in two unrelated languages, Lhasa Tibetan and Hare, where he also describes mirative meaning using the same kind of psychological notions:

[Mirativity] marks both statements based on inference and statements based on direct experience for which the speaker had no psychological preparation... What these apparently disparate data sources have in common ... is that the proposition is one which is new to the speaker, not yet integrated into his overall picture of the world (DeLancey 1997: 35-36).

Mirativity of this kind has been characterized using a variety of related descriptors; a sample of these include ‘non-expected’ information (Egerod and Hansson 1974), ‘surprise at unexpected new information based on immediate observation’ (Friedman 2003, p. 197, 200), ‘just discovered’ (LaPolla 2003), and ‘new knowledge’ (DeLancey 2001: 369), ‘unsupposedness’ (Lemmens and Sahoo 2017), and “drastic deviations from the speaker’s expectation” (Merin & Nikolaeva 2008). These descriptions provide an important clue to understanding mirativity. Dickinson (2000) further sharpens the characterization of mirativity by identifying two different aspects concerning how a speaker’s mental state is conditioned by either their immediate experience of an event, or by previous experiences and expectations:

In a mirative system, events and states that cannot be easily assimilated are coded differently than those that easily fall in with the speaker's expectations. One construal is based on the speaker's past experiences of similar situations and his general knowledge. This set of assumptions can range from knowledge about purely physical interactions to assumptions based on cultural and social norms. The second construal is based on the speaker's immediate experience of an event or state. If the immediate situation does not correlate well with the speaker's expectations, the proposition coding the event or state receives special marking (Dickinson 2000: 379).

What is insightful here is how Dickinson's construals ground mirativity in the psychological orientation of the speaker, both in terms of their individual knowledge (their personal experiences and fixed assumptions about the way the world works), and their knowledge of the context (their immediate experience of a state, event, or action). As such, the speaker's psychological orientation in any given context can be transformed upon encountering new information. This can then lead to a sense of surprise, among other similarly related notions such as sudden realization and lack of situational awareness (Peterson 2015).

1.2 Cross-linguistic diversity

This article focusses on how mirative meaning is encoded by morphology, which, as can be observed comparing examples in the previous section, is only a subset of the ways mirative meaning can be expressed intra- and cross-linguistically. Studies on individual languages are gradually bringing the typological picture of mirativity into clearer focus, and there have been recent attempts to form generalizations and investigate both the sources of mirativity and connections to other cognitive, semantic and grammatical categories (i.e. Aikhenvald 2012). However, at the time of writing there are no book or dissertation-length typological investigations devoted to the grammatical, lexical and morphological realizations of mirativity from a cross-linguistic perspective. For example, it is worth noting that currently we are not aware of the proportion between languages that have morphological miratives and those that do not.

The simplest cases involve morphemes that encode mirativity independently of any other kinds of meanings introduced by grammatical evidentials or aspect: the non-implicated miratives. Interestingly, there are only a few clear cases of this in the documentation literature of bound morphemes that encode mirativity. Example (2) showed how the morpheme *-q* suffixes to the verb stem and expresses the speaker's surprise at the state, event, or activity denoted by the sentence. Molochieva (2010: 217) reports that the suffixation of *-q* marks an event in "which the speaker has seen and which was unexpected for him/her". In another example (4) from Chechen (Molochieva 2010: 217 in Aikhenvald 2012: 446), the children were playing with a chicken, putting it into a cage, and it escaped; the speaker and the addressee witnessed the event denoted by the sentence:

- (4) hwazh-ahw, j-ied-**iq** iza
look.IMPV-IMPV.POL J-run.IMPV-RECWITPST-**MIR** 3SG.NOM(j)
'Look! It has escaped.'

In another case involving morphology, the prefix *rahe-* in the Nepali example in (5) is uttered upon the speaker's "instantaneous and surprising realization of the beauty of a lake" (Lazard 2000, p.211):

- (5) āhā, kasto rāmro pokhrī rahe-cha!
ah que beau lac MIR-est
'Ah! qu'il est beau, le lac!'

In example (6), Caddo (Caddoan) uses the admirative or mirative prefix *hús-* to express that "a situation is unexpected, or surprising to the speaker" (Melnar 2004: 90; Chafe 1995: 357–358, 2005: 339 reported in Aikhenvald 2012: 449):

- (6) hús-ba- ʔa=sa-yi-k'awih-sa?
ADM-1.BEN.IRR-name-know-PROG
'My goodness he knows my name!'

As mentioned in section 1, the roots of work on mirativity can be found in the often rich descriptions of it in the language documentation literature, where it is often observed either as a 'side-effect' of grammatical evidentials, or through a special use of a particular morpheme, word grammatical construction in surprising speech context. The mirative use of evidential *-miş* in (3) is one example of what was later discovered to be a robust connection between grammatical evidentiality and mirativity. For example, in Gitksan mirativity is entirely dependent on the grammatical evidential *'nakw*. As such, the sentence in (7) has two possible translations:

- (7) 'nakw=hl witxw=s Alvin
EVID=CND arrive=PND Alvin
Evidential translation: 'Looks like Alvin is here. [I see his truck in the driveway]'
Mirative translation: 'Alvin's here!'

As with Turkish *-miş*, *'nakw* is an indirect evidential: its normal use is in a context in which the speaker does not know whether Alvin is here; rather, she has indirect evidence for his arrival (his truck is in the driveway). However, in a variation of this context, one where Alvin unexpectedly walks through the door, the utterance of (7) now expresses the surprise of the speaker. Mirativity can be found on evidentials that encode different kinds of information sources. In example (8) in Mapudungun (isolate, Chile; Zúñiga 2000; Aikhenvald 2004: 200) the reportative evidential can be used miratively:

- (8) aku-rke-y.
arrive-REP-DECL
Evidential interpretation: 'S/he arrived (they said).'

Mirative interpretation: 'S/he arrived (surprisingly)!'

For example, in Kham the insertion of an inflected auxiliary *o-le-o* can be used to express the surprise of the speaker, as in the minimal pair in (9) shows (Watters 2002, p. 288-93, cited in Aikhenvald 2004, 2012):

- (9) a. ba-duh-ke-rə
go-PRIOR-PERF-3p
'They already left/went'
- b. ya-ba-duh-wo o-le-o
3p-go-PRIOR-PERF.NOMN 3sg-be-NOMN
'They already left!'

There is nothing inherent in the meaning of auxiliary *o-le-o* that expresses mirativity. Rather, it is the use of this particular grammatical construction in a surprising context. Mirativity is often expressed through structure this way. In another example, Wiklund (2009) reports that the *take-V* construction in the Scandinavian languages (or what are called *pseudo-coordination*) have a strong surprised reading, as in the minimal pair in the Swedish example in (10) shows:

- (10) a. John läste en bok
John read.PAST a book
'John read a book.'
- b. John tog och läste en bok
John take.PAST and read.PAST a book
[Surprisingly, unexpectedly, suddenly] 'John read a book.'

Because of this immense diversity (of which this is a very small sample), descriptions of mirativity were often language-specific and analyzed on a case-by-case basis. Even so, based on these studies there are number of emerging generalizations in the relatively nascent mirativity literature, two of which are reviewed here.

Aikhenvald (2012: 437) provides the first cross-linguistic study that synthesizes the various descriptions of mirativity into five major subtypes, given in (11):

- (11) a. Sudden discovery, sudden revelation or realization by the speaker, the audience (or addressee), or the main character
b. Surprise of the speaker, the audience (or addressee), or the main character
c. Unprepared mind of the speaker, the audience (or addressee), or the main character
d. Counter-expectation of the speaker, the audience (or addressee), or the main character
e. Information new to the speaker, the audience (or addressee), or the main character

The typology of mirative meanings in (11) provide both nuance to defining the category of mirativity, showing that mirativity is not just about surprise, while also paying attention to who 'experiences' mirativity in the speech context. These meanings are not exclusive: a language may have one or more of these kinds of mirative meanings, or a language may specifically foreground one of these meanings.

Peterson (2017) focusses on the linguistic and grammatical expressions of mirative meanings such as (12) in a sample survey of languages, and claims that these can be divided into two main types. The first type, called *non-implicated mirativity*, includes words, morphemes, or

structures that express mirativity as their main meaning independently of any other kinds of meanings. The second type, called *implicated mirativity*, is based on the surprise interpreted as a ‘side effect’ of the use of certain words, morphemes or structures in a surprising context.¹ Under this view, the Chechen mirative suffix *-q* in (2) is non-implicated because it lexically encodes its mirative meaning independently of any of the other meanings expressed by the sentence. In Yucatec Maya the word *bakáan* expresses that some information is ‘new, surprising, and unexpected’ (AnderBois 2016, 2018), as in example (12):

(12) Context: We are inside the library. I suddenly look out the window and notice it is raining, which it hadn’t been before, and say:

Táan bakáan k’áaxal ja’
PROG MIR A3 fall water
‘Oh, it is raining.’ (AnderBois 2016)

On the other hand, the mirativity associated with the utterance in (9) in Kham is interpreted as mirative, not because there are mirative-encoding words or morphemes, but because it was uttered in a context where it is *interpreted* as surprise by the participants in that speech context. Section 1 showed that this is a prevalent feature of grammatical evidentials, including the indirect evidential *’nakw* in Gitksan. Example (13) spells out these distinguishing contexts in more detail: (13a) is an indirect evidence context, as the speaker (Wanda) is assessing the auditory information, supporting the assertion that it is raining. When used in a direct evidence context as in (13b), *’nakw* is interpreted as surprise:

(13) a. *Evidential context:* Wanda and her colleague are planning a hike in the mountains that afternoon. While making plans over breakfast, they hear raindrops on the roof and the sound of car tires in going through water.

’nakw=hl wis
EVID=CN rain
‘[It looks like] it’s raining.’

b. *Mirative context:* Wanda and her colleague are planning a hike in the mountains that afternoon. Aware of this prediction, and being familiar with the typical desert climate, they step outside into the pouring rain. Wanda exclaims:

’nakw=hl wis
EVID=CN rain
‘[It looks like] it’s raining!’

In Cheyenne (Plains Algonquian, Montana and Oklahoma) the narrative evidential has a similar mirative function in certain contexts (Murray 2010; Rett & Murray 2013). On an evidential

¹ In Peterson (2017) *non-implicated* and *implicated* mirativity were called *non-parasitic* and *parasitic* mirativity, respectively. This change of terminology is immaterial for the purposes of this article. It should also be clarified that the term *implicated* is intended in a general sense, and not in a Gricean sense (although it is compatible with the Gricean sense).

interpretation, as in (14a), it indicates that proposition expressed by the sentence (*It rained long ago*) is part of a story, typically occurring with the remote past marker. The narrative evidential can also have a mirative interpretation in a context where the speaker knows the proposition embedded under the evidential is true, as in (14b).

- (14) a. É-x-hoo'k'ohó-neho.
3-REM.PST-rain-NAR.SG.INAN
'It rained long ago, it is told.'
- b. É-hoo'k'ohó-neho!
3-rain-NAR.SG.INAN
'It's raining!'

Although Peterson and Murray have different accounts (which are reviewed below) of what level of meaning mirativity is expressed on, these are examples of implicated mirativity. The distinction between implicated and non-implicated mirativity and how to test them are discussed in more detail in section 2.2.

Mirativity can also be implicated by verbal categories and other morphology that have no connection to evidentiality, sometimes involving complex constructions. In Tatar in (15) the meaning of 'unexpected action and ensuing surprise of the speaker' is implicated by the combination of a 3rd person singular prohibitive and the interrogative particle *-me* (Nasilov et al. 2001: 218 reported in Aikhenvald 2012: 464):

- (15) kič belän färid kil-ep ker-mä-sen-me
evening with Farid come-CONV enter-NEG-IMPV.3SG-INTER
'Unexpectedly, Farid came in the evening.'

This section presents only a brief survey of the many ways mirativity is found in language. Aikhenvald (2012) provides a useful cross-linguistic study of mirativity which is implicated through, for example, complex verbal constructions, affixes and other particles with a range of mirative meanings, person marking, as well as a study of marking of mirative meanings in languages with larger evidential systems.

2. Approaches

Mirativity in recent years has become an area of interest to linguists from descriptive, functional, and theoretical perspectives, and across all of the major domains of linguistics. As descriptions of the world's lesser studied languages grow, we are now starting to get a fuller picture of this intra- and cross-linguistic diversity, both in how mirative meaning is grammatically expressed but also its relation to other kinds of meaning. This diversity has also revealed many questions and methodological challenges to the field linguist. Among these are: what are the limits to the range of meanings does the term 'mirativity' cover (i.e. those identified, for example, in 11)? How do you actually elicit the language of surprise or any of the meanings in (11)? These issues are immediately apparent in the unexpected desert rain scenario in (1): even in a relatively well-studied language such as English, to document the language in (1) the linguist would need to create a genuine experience of surprise at the raining event. Even then, the linguist can only hope for is that the speaker responds appropriately and produces spontaneously utterances of surprise.

Additional complications are introduced in cases where mirativity is implicated, as this is just as much about how a mirative utterance is interpreted as it about how it is expressed. As such, discovering mirativity often involves equal amounts of serendipity, trial, and error. However, the following section discusses what such a methodology might look like.

Explanations of mirativity, whether functional or formal, face their own set of challenges. Again, cross- and intra-linguistic diversity is the main challenge, given the myriad of ways mirativity can be linguistically expressed, through words, information structure, morphology and syntax. As such, any unified theory of mirativity must not only ideally account for this diversity, but also explain a kind of meaning that is tied to the speech context in different ways. Here, too, interesting progress has been made, which is reviewed in section 2.2.

2.1. Discovering mirativity

Mirativity is abundant in language; however, it is also an elusive kind of meaning to discover and document for the linguist. In fact, in surveying many of the descriptions of individual languages where mirative meanings are documented, one can get the sense that the surprise meanings of certain morphemes or constructions were discovered by accident. This is not intended as a criticism of those researchers who undertake the challenging task of describing understudied or endangered languages; rather, it is an indication of three things: first, in order to discover mirative-expressing language, a context or situation must be naturally constructed that is truly surprising to the language consultant. In a typical language documentation setting, where control of the context is often necessary to elicit specific kinds of language and obtain robust judgments, creating a truly surprising event for the speaker is challenging, at least from a practical standpoint. Additionally, surprise is essentially a type of response to external stimuli; these responses can vary widely from person to person: what is surprising to one person may not be to another. There may also be cultural conditions on expressing the kinds of emotions associated with surprise or unexpectedness (Mellers et al 2013).

Second, while there are tests to probe mirative meanings once they are discovered, there is little established field methodology for creating a surprising context in a language documentation setting that can be easily replicated and implemented (although see Peterson 2017). Third, it is important to distinguish between mirative-encoding language triggered by contexts that are genuinely surprising, and language that is used to talk about surprise. This difference is apparent in English. For example, the utterances in (1) above can be described as expressing mirativity: the speaker is actually surprised at the unexpected event of rain. Now consider an extension of this context: later that afternoon Wanda is having coffee with Francesca, who enquires about Wanda's hike earlier that day. Wanda responds: "Well, I was *surprised* it was raining, as the forecast called for sun." Wanda is not expressing surprise - even using the verb *surprise* - but rather reporting it. This distinction is often not controlled for in the documentation literature (see also Rett & Murray 2013: 455 for similar discussion).

A useful preliminary testing ground for mirativity in the field is to look at the grammatical category of evidentiality. Section 1 provided only a small sample of the many languages which grammatically encode the information source a speaker has for making an assertion, and how indirect evidentials often implicate mirativity. Because mirativity is implicated and not a part of the entailed or presupposed meaning of an indirect evidential, the mirative interpretation of an indirect evidential must be driven by the speech context. In Tsafiki (Barbacoan) the indirect evidential suffix *-nu* encodes 'information inferred from physical evidence' as in (16a) (Dickinson 2000: 411-412). In certain contexts - one in which the speaker

firsthand knowledge of the proposition expressed by the sentence - evidential *-nu* expresses mirativity, as in (16b):

- (16) a. tse lowa=bi ne=chi keere-i-i-nu-e
1FEM bed=LOC from=LOC throw-become-NCONGR-EVID-DECL
'I must have fallen out of bed.' (I'm on the floor).
- b. moto jo-nu-e
motorcycle be-EVID-DECL
'It's a motorcycle!' (I see the motorcycle approaching)

In (16b) the speaker uses an *indirect* evidential in a *direct* evidence context. As such, mirativity is the consequence of the interpretative tension that is caused by this 'misuse' of an indirect evidential in a direct evidence context. This is a robust generalization cross-linguistically, and Peterson (2017: 330) uses this to formulate the *witnessing heuristic*, defined in (17):

- (17) *The Witnessing Heuristic*
If a speaker uses an *indirect* evidential in a *direct* evidence context (i.e. the speaker knows that the proposition *p* embedded under the evidential is true), then the evidential *implicates* (not entails nor presupposes) surprise (mirativity).

As with any heuristic, the purpose of (17) is to offer a practical first step for testing the possible mirative use of an indirect evidential. Based on more general field methodologies that probe meaning in language (Matthewson 20014; Bochnak & Matthewson 2015), Peterson (2017) lays out a set of criteria of what this might look like for mirativity. For example, once mirativity is discovered, it can be further tested by applying the kinds of diagnostics that target specific levels of meaning through the questions in (18):

- (18) Empirical tests for surprised meaning:
- Entailment*: Does surprised meaning affect the truth conditions of the sentence?
 - Implicature*: Can the surprised meaning be targeted for cancellation?
 - Challengeability*: Can the surprised meaning be targeted for assent or dissent?
 - Displacement*: Can the surprised meaning be displaced in time and space?
 - Embeddability*: Can the surprised meaning be semantically embedded?

Section 2 presents an application of the tests in (18a-d). The example below tests (18e) *embeddability*. In (19a) the indirect evidential *'nakw* implicates mirativity in a context where Alvin suddenly appears in the doorway. However, when the speaker reports the surprise of granny at the unexpected arrival of Alvin in direct discourse, the result is infelicity:

- (19) a. 'nakw=hl bakw=diit
EVID=CD arrive.pl=3pl
"They're here!"
"Look who's here!"
"I see you're (pl) here!"

- b. #diya=t nits'iits' wil "n'akw=hl bakw=diit"
say=PD grandmother COMP EVID=CD arrive.pl=3pl
#"Granny said look who's here(!)"

The infelicity of (19b) is the result of semantically embedding the mirativity of Granny, who is the subject of sentence, but not the speaker of the sentence. This result is expected given that mirativity is about the surprise of the speaker of the sentence. In another case, the mirative enclitic =*am* in Cupeño often expresses 'firsthand, new discovery, surprise' (Hill 2005: 66). The non-implicated status of mirative =*am* is supported by the observation that it can be embedded in direct discourse, as in (20):

- (20) mu=ku'ut "Isi-ly=*am*!" pe-yax=ku'ut
and-REP coyote-NPN=MIR 3SG-say-REP
'And it is said 'It's coyote!' he said it is said.'

Note how the English translation in (20) also suggests that the surprised intonational contour (represented by '!') can also be semantically embedded. This simple application of the embeddability test reviews two things in Gitksan and Cupeño: first, the mirativity implicated by '*nakw*' is speaker-oriented (and not subject-oriented), while the mirativity expressed by =*am* is subject-oriented (although further testing is needed on a related example to determine if =*am* can also be speaker-oriented).

Although there are many rich and detailed descriptions of mirativity (implicated or non-implicated) quite often these descriptions do not include these basic semantic tests (although see AnderBois 2018). This opens up an avenue for future investigation which will add a new dimension to descriptions of mirativity.

2.2 Explaining mirativity

Attempts at explaining mirativity have only recently become viable now that the empirical picture is beginning to fill out. These explanations have been approached from many different perspectives, and are often conditioned by the particular grammatical features of the language being examined. Although it is beyond the scope of this article to review all of these in detail, this section reviews and evaluates a representative case of functional/historical (Aikhenvald 2012; Peterson 2015, 2017), and formal/theoretic explanations (Peterson *forthcoming*; Rett & Murray 2013; AnderBois 2018) to give the reader a sense of the research done in these areas, as well as identifying questions for further research.

The mirative use of indirect evidentials is likely the most widespread and best understood of implicated mirativity. The analytical questions here are, why are indirect evidentials used this way? What semantic features do they have that make them amenable to being used miratively? Aikhenvald approaches these questions from a historical and functional perspective, and proposes a number of 'semantic paths' of grammaticalization that yield the mirative interpretations of indirect evidentials (2004: 208, 2012: 470). Two such paths are reproduced in (21) and (22):

- (21) Lack of firsthand information → speaker's non-participation and lack of control → unprepared mind and new knowledge → mirative reading

- (22) Speaker's deliberate non-participation → distancing effect → presenting the information as new, unexpected, and thus 'surprising'

One can recognize many of the same descriptors used in previous descriptions of mirativity in section 1 and the typology in (11). What Aikhenvald is attempting to capture with these paths is how specific semantic dimensions of indirect evidentials (whether expressed through grammatical evidentials, or other words and constructions that implicate evidentiality), such as 'lack of firsthand information' and 'unprepared mind and new knowledge', can be leveraged by the speaker in surprising contexts to express what we call mirativity. The paths raise a number of questions; for example, are these actually about grammaticalization, in the sense that evidential morphemes become mirative morphemes as part of their evolution? Also, are the points in the paths connected, and can we track an evidential at some point in this path and test its meaning (i.e. through modifications of the witnessing heuristic in 17)?

However, Aikhenvald identifies a crucial feature of the context and grammar: all of the evidentials that follow these paths are the result of a non-first hand evidential to remark on a context that involves the speaker, such as Khwarshi (Northeast Caucasian language), where the past unwitnessed form can be used with 1st person subject. This refers "to a situation where the speaker is not conscious or the speaker suddenly realizes something as a surprise" (Khalilova 2009: 229 in Aikhenvald 2012: 469), as in (23).

- (23) do Ø-uh-un Ø-eč-un-ay-ko
1SG.ABS I-die-PFV.CONV I-be-PST.UNWIT-NEG-INTENS
[Malla-rasan got up from the place where he was, thinking that he had died and then said:] 'Apparently I had not died!'

Aikhenvald notes "[i]f the speaker is talking about themselves, to employ a non-firsthand, nonvisual, or inferred evidential appears counterintuitive: can't I see – or have firsthand experience – of what I am doing, or feeling, myself? This is where an evidential acquires additional overtones." In another example that shows a similar tension between the grammar and context in Ladakhi in (21), where the suffix (*-tshuk*) is used in the same sentence as a 3rd person subject as a grammatical expression of narrative past "in folk narrations, old stories, and historical, mythological and legendary narrations" (Koshal 1979: 217–225 in Aikhenvald 2012: 468), in combination with the reported evidential. With 2nd person subjects, this same suffix, also accompanied by the reported evidential suffix, implicates that the speaker is surprised that the subject did, or decided to do something which the speaker did not expect (Koshal 1979: 218 in Aikhenvald 2012: 468):

- (24) ñe-rəŋ-ŋə hindi khyen-nət-tshuk
2SG.HON.DAT Hindi know-REPPRES-NARR
'So! You know Hindi [the speaker is surprised at it].'

Example (25) is amenable to the analysis in semantic path (21), as Gwen (the speaker of the sentence) lacks control over the situation and is faced with new knowledge, thus implicating her surprise:

- (25) Context: Gwen is preparing a surprise birthday party for Alvin; the guests are arriving one by one. Holly and Gwen are preparing the table inside, when Alvin walks through the door, unexpectedly. Gwen exclaims

'nakw=hl witxw=s Alvin
EVID=CD arrive=PD Alvin
'Alvin's here!'

We can focus on one observation made in Aikhenvald: the apparent 'incompatibilities' between grammatical elements within the same sentence (such as Ladakhi), or between the grammatical form of the sentence and the speech context. Gitksan exemplifies the latter kind of incompatibility: the use of an indirect evidential used in a direct evidence context. Peterson (2010 2017, *forthcoming*) claims that we have the key ingredients required for analyzing implicated mirativity as actual Gricean conversational implicature: first, we can test and confirm that the implicated mirativity of an indirect evidential found in certain contexts is, in fact, implicated and not entailed. Example (26) from Turkish shows how the mirative meaning of the indirect evidential *-miş* can be implicated in a direct evidence context. The mirative meaning can then be targeted for cancellation without leading to a contradiction:

- (26) Direct evidential context: Upon seeing Kemal walking through the door, Ahmet exclaims

[Kemal gel-*miş*...] *surprise implicated*
Kemal came-EVID
[...ama ben o burada sürpriz değilim] *surprise cancelled*
'Kemal [apparently] came...but I'm not surprised he's here.'

This is a standard empirical diagnostic for testing conversationally implicated meaning. A conversational implicature analysis of the direct use of an indirect evidential also correctly predicts that implicated mirativity is about the context, and what the speaker assumes about the speech participants know about that context. It then follows that the surprise expressed by Gwen in (25) and Ahmet in (26) is only *expressed* by those speakers: this sense of surprise can only be interpreted as such by the others in the speech context to the extent that they can calculate the mirative implicature.

Rett & Murray (2013) and Peterson (2017, *forthcoming*) attend to the mirative uses of evidentials that involve a kind of non-implicated mirativity, but where the mirative meaning is not necessarily entailed. This kind of non-implicated mirativity is found in the English utterances in (1), one example of which is repeated in (27). Targeting the surprise-expressing particle *wow* and the surprised intonational contour leads not to a contradiction, but rather infelicity:

- (27) 'Wow, it's raining!!'
'Not that I'm surprised or anything...'

As such, *wow* may be called a kind of non-implicated mirative. However, this could possibly suggest that the surprise encoded by *wow* is entailed; however, the judgment in (27) shows that this is not the right analysis. Rett & Murray (2013: 462) identify a similar effect with the narrative evidential suffix *-neho* in Cheyenne. When used in a situation where the speaker has

knowledge of the proposition expressed by the sentence, *-neho* expresses mirativity, but when targeted for cancellation infelicity results in (28b):

- (28) a. Ná-něšè-héne'ena-∅ tsé-to'sè-hešè-hoo'koho.
1-continue-know.s.t-DIR CNJ-going.to-how-rain
'I knew it was going to rain.'
- b. É-hoo'kòhó-**neho!** ...# Ná-něšè-héne'ena-∅ tsé-to'sè-hešè-hoo'koho.
3-rain-NAR.SG.INAN 1-continue-know.s.t-DIR CNJ-going.to-how-rain
Intended: 'It's raining! ... # I *knew* it was going to rain.'

In somewhat of an inverted characterization, they describe mirative evidentials in Cheyenne as 'mirative markers that additionally encode evidential, not-at issue content.' (2013: 467). Rett & Murray explain this effect by casting mirativity as a type of *illocutionary mood*. This relates the infelicity effect of (28b) to a similar effect found when challenging the meaning introduced by, for example, an illocutionary adverb in English:

- (29) a. A: Damn! Barbara forgot to put gas in the car again!
B: No! That's not true. (≠ you are not upset)
- b. A: Frankly, my opinion is that Bruce should do it.
B: No! Not true (≠ you are not being frank)
- c. A: Surprisingly, Steve has improved his attitude.
B: No! Not true (≠ you are not surprised)

In each of these cases the meanings introduced by the illocutionary adverb resist denial (cf. the *challengeability* test in 11). Triangulating (27)-(29), Rett & Murray's (2013) analysis of illocutionary mirativity makes use of Rett's (2011: 429) illocutionary operator E-FORCE, defined in (30):

- (30) E-FORCE(*p*), when uttered by *s_c*, is appropriate in a context *c* if *p* is salient and true in *w_c*. when appropriate, E-FORCE (*p*) counts as an expression that *s_c* had not expected that *p*.

E-FORCE(*p*) is used to account for a wide variety of non-implicated/non-entailed mirativity, especially exclamation, as meaning expressed through the illocutionary force of a sentence. Under this analysis of, the mirative intonational contour on a sentence such as *It's raining!* is analyzed as having two levels of meaning, sketched out in (31), where the surprise meaning of the sentence is a subpart of the illocutionary force:²

- (31) "It's raining!"
- a. *At-issue (entailed) content*: *p* = It's raining
- b. *Illocutionary relation*:
- i. propose to add *p* to the Common Ground (assertion)

² In order to make the technical analyses more accessible to the non-specialist, some simplifications have been made to Peterson (*forthcoming*), Rett and Murray (2013) and AnderBois (2018). The reader is referred to these original sources for many of the finer technical details of these analyses which have been left out here.

- ii. speaker did not expect that p

This captures the non-implicated (but also not entailed) mirativity of ‘!’ as being expressed at the illocutionary level of meaning. Murray (2010) analyzes the evidential meaning of the evidential -*hoo'o*, as in *Hawk won-hoo'o*, as not part of the entailed (at-issue) meaning of the sentence it attaches to. Rather, evidential meaning is represented on its own level as part of the *not-at-issue* content of the utterance, sketched out in (32), where the evidential content is represented as $E_c^t \models p$, which means that p is entailed by the community’s expectations c at that time in the past t .

- (32) “Hawk won-*hoo'o*” (non-mirative)
- a. *At-issue content*: $p = \text{Hawk won}$
 - b. *Not-at-issue content*: $E_c^t \models p$
 - c. *Illocutionary relation*: propose to add p to the CG

In a direct evidence context, one where the speaker witnesses Hawk winning the race, the utterance of *Hawk won-hoo'o* expresses the speaker’s surprise. For Rett & Murray, mirativity is about expectation formation (which they formally implement in their technical analysis). As such, the illocutionary relation is ‘split’ to assert that p , and to express that p was not previously in the speaker’s expectation set.

- (33) “Hawk won-*hoo'o*” (mirative)
- a. *At-issue content*: $p = \text{Hawk won}$
 - b. *Not-at-issue content*: $E \models p$
 - c. *Illocutionary relation*:
 - i. propose to add p to the CG
 - ii. p was not previously in the speaker’s expectation set

AnderBois (2018) follows Rett & Murray (2013) in attempting to explain mirative meanings that are not (conversationally) implicated but rather express meaning at the illocutionary level. The mirative word *bakáan* can be inserted into a wide range of sentence types; however, a typical use of *bakáan* is in (34). The context in (34a) is infelicitous because the speaker does not experience surprise at this fact (perhaps because the speaker has witnessed this particular turtle eat papaya previously). However, the context in (34b) is felicitous as the speaker has not witnessed this particular turtle eat papaya:

- (34) Áak-o’ob-e’ su’uk k-u jantik-o’ob, chen ba’ale’ le a’ak-a’ puut
turtle-PL-TOP grass IMP-A3 eat-PL just but DEF turtle-PROX papaya
bakáan k-u jantik
MIR IMP-A3 eat
‘Turtles eat grass, but this one apparently eats papaya!’
- a. #Context: Turtles normally eat grass, but I have a pet turtle who for some reason always eats papaya instead of grass.
 - b. Context: Turtles normally eat grass, but we see a turtle who for some reason papaya instead of grass.

By applying the kinds of semantic tests in (18) AnderBois shows that ‘revelation’ is an additional mirative state to the ones set out in (11), as the sense of revelation encoded by *bakáan* does not include new information, surprise, counterexpectation, or the other mirative states in (11). In a nutshell, in addition to performing a speech act using the update associated with the rest of the sentence (which can include sentence types and speech acts other than declaratives and assertion), a speaker who utters *bakáan* conveys a sudden revelation regarding this update.

When considering how to explain such an empirically diverse phenomenon as mirativity, it is worthwhile exploring how to connect what are, at least at face value, these psychologically-based characterizations of mirativity, to what we know about surprise in domains where it has been studied independently of language. Indeed, there is a vast body of research on surprise in psychology, the cognitive sciences, and other experiment-driven fields. However, in these domains too, there is debate as what ‘surprise’ actually is. There are three dominant views: First, Ekman et al. (1983) claim that surprise is a basic human emotion, which belongs to the (closed) class of emotions: happiness, sadness, anger, fear, and disgust (see also Meyer et al 1994, 1997; Reisenzein 2000). Second, the cognitive approach to surprise subdivides into a number of areas, but generally center around the hypothesis that surprise is belief-based experience that reflects the likelihood of events. This can be tested various ways in an experimental setting. For example, Itti & Baldi (2006) report the results on a number of experiments in visual cognition using eye tracking, where subjects are presented scenes that contain an unexpected event and saccadic movement tracked. The eye-tracking from these experiments results provide a quantifiable dataset whereby surprised responses can be measured and generalized. One of the outcomes of this research is the formulation of a probabilistic analysis of a surprising event, which Itti & Baldi use to define a function for a unit of ‘wow’. The third approach attempts to integrate these two approaches, which claims that surprise serves to cognition and emotion (Mellers et al 2013). Although couched in probabilistic terms, Mellers et al claim that ‘[s]urprise modulates the comparison between what occurred and what might have occurred under another state of the world, making unexpected events greater in emotional intensity’, which is explained in what they call *decision affect theory*.

While it is beyond the scope of this paper to critically evaluate these non-linguistic approaches to surprise, Peterson (2015) attempts to put these analyses of surprise in areas such as visual cognition and schema theory into the service of helping explain mirativity. Taking an information-theoretic approach, Peterson (2015) claims that mirativity is fundamentally about surprise, which is a linguistic response to what is called *new environmental information*, defined in (35):

- (35) *New Environmental Information* is relative to an information agent *A* in a context *c* iff
- (i.) It has not been previously observed or perceived by *A* in *c*, and
 - (ii.) It is spatio-temporally bound to the context *c* as acquired by *A*.

The function of a mirative utterance is to draw the attention of interlocutors to a surprising event. Under this view, both implicated and non-implicated mirativity are essentially a kind of deixis, an act of pointing (see also Napiorkowska 2016 for a similar approach). This is probably most apparent in the mirative use of direct evidential verbs in English, such as in (1) *Look at this rain(!)*, or *I see that it's raining*. Furthermore, it is claimed that a definition of mirativity as surprise entails the other kinds of mirative meanings identified by Aikhenvald in (11). For example,

surprise entails new information (i.e. one cannot be surprised at old information), counter-expectation (i.e. one cannot be surprised at something that is expected), and sudden discovery or revelation (i.e. one cannot be surprised at something already discovered or revealed). There are two additional predictions made by the application of (35): first, the mirativity seems to have a ‘shelf life’: because surprise is about the context, once that context has changed to a significant degree in space and time, mirative meanings, whether implicated or non-implicated, become infelicitous.³ Second, (35) ensures that the surprising stimulus is about the speech context (the *environment*), as opposed to *linguistic* information. While information in the form of a report can elicit surprise, (35) predicts that an indirect evidential cannot be used to implicate the speaker's surprise.

In sum, explanations of mirativity (of which this section only provided a sample of), whether functional or formal, complement the kinds of empirical tests in section 2.1., as they make predictions that can be tested in other languages. These studies also contribute new methodologies for testing mirativity. However, any analysis of mirativity can only be as effective as the empirical data it seeks to explain, and there are still many crucial gaps in the descriptions of mirativity. One of the next frontiers is to find a way of linking the study of the language of surprise with, for example, experiments in visual cognition and surprise; this has yet to be worked out. Other frontiers have already been opened up in the areas of corpus studies (Sahoo & Lemmens 2017; Soriano et al 2015), and theoretical syntactic accounts of mirativity that explain exclamatives, mirative words and structures (Wiklund 2009; Rett 2011; López 2017).

Further Reading

In the decade leading up to the time writing this article, mirativity has grown into it an active, vibrant field of study in its own right. A simple online search for ‘miratives’ or ‘mirativity’ will yield a plethora of journal articles and dissertations devoted to the description and analysis of mirativity across all of the domains of linguistics. Among these are the many excellent descriptions and analyses of mirativity that can be found in individual language studies, only a few of which are referenced in this article. At the time of writing there are three journal volumes devoted to mirativity, which provide a convenient entry point to mirativity studies. An issue of *Linguistic Typology* (2012; volume 16, number 3) is the first collection of papers of its kind devoted to mirativity. In addition to examining mirativity from historical, typological, descriptive, and functionalist perspectives, this volume is a useful resource and gateway for further investigating mirativity in individual languages, as well as offering a critical reassessment of past research. The journal *Review of Cognitive Linguistics* has published two special issues on surprise: *Expressing and Describing Surprise* (Celle and Lansari eds. 2015; volume 13, issue 2) and *The Linguistic Expression of Mirativity* (Celle and Tsangalidis eds. 2017; volume 15, issue 2). At the time of writing these two volumes and the papers within them are the state-of-the-art on mirativity studies. Whereas the special volume of *LT* focusses on debating the status and history of mirativity as a linguistic and grammatical category, the two *RCL* volumes evolve the research on mirativity by contributing new analyses, primary language data, and methodologies, including a novel approach to examining mirativity in corpora (Sahoo & Lemmens 2017) and links to emotion research (Soriano et al 2015).

³ This is analyzed as the *recency restriction* in Rett & Murray (2013: 465).

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