

# Causal Annotation Handbook

For this exercise, we want to better understand the *sequential relations* of **actions** and **sentences** in narrative texts. How explicitly connected are actions/sentences in a narrative?

## Definitions

According to our definition, actions can be sequentially related in the following two ways:

1. Causally. When a prior action or state causes a subsequent action or state to happen. Note that the causal action is always temporally prior to the caused action (but may appear after in the text). Causality can be expressed within the boundaries of a sentence (as when I say I did X, because Y happened). Or across boundaries of a sentence. Event/state X was the cause of event/state Y.
2. Coherently. When statements are "about" the same thing we can think of them as being "coherent" and thus related, albeit not in a causal way. The easiest way to think about this is whether a set of entities is passed from one statement to the next. I can understand what is being discussed because that which is being discussed has already been discussed. I have been semantically prepared for the subsequent statement (even if the previous statement did not cause it). Incoherence occurs when a statement has no discernible relationship to proximate prior statements.

How can we define causality? We use van den Broeck's 4-part model:

temporal priority:	the causal event must be temporally prior to the caused event
operativity:	the causal event must be active when the caused event occurs (i.e. is not subsumed by events when the caused event occurs)
necessity:	the caused event would not have occurred without the causal event
sufficiency:	if given the circumstances of the story, the causal event occurs then the caused event occurs.

The first thing to notice about van den Broek's definition is the way it is event-centric. The "event" is assumed to be the basic unit of causal narrative relations. Causality is understood as a particular kind of relationship between events. This suggests that in order to understand narrative causality we will also need a theory of narrative "events." The second important detail to note is that according to van den Broek's schema, the first and second terms are binary (the second event either is before or after the first), while the third and fourth are relative (a causal event may be more or less necessary). Thus we will be annotating causal events using both a binary score and a scaled score to capture greater degrees of causal connectedness.

## What is an event?

An event is any action undertaken by an agent. Examples:

1. And yet **you killed** the Demon King.
2. Then **he became** part of the crowd.
3. After all this, **Kate and Edward were** quite pleased.
4. ... **she said**.

Notice how events can take objects (you killed the Demon King) or can simply be states (they were pleased).

Also note that an "event" is something that *\*actually\** happens in the diegetic universe of the narrative (or actually does NOT happen, more on this in a second). An event for us is not a *\*hypothetical\** event (I would go to the store, except... is thus not an event because it neither happens nor doesn't definitely not happen, it is simply postulated). For an event to be caused, it must actually happen or not happen and for an event to cause something it must have actually happened or not happened. In other words, something NOT happening can be the cause of something else happening (or not happening). For example:

*But when Jade Dragon saw what her children had done, she cursed herself for her pride. No longer would her dragon children fly in the air with her or call her Mother. Her heart broke in grief and sadness.*

Her children "not flying" and "not calling" her Mother is the cause of the event of her heart breaking in grief and sadness. Neither of these is hypothetical.

The one exception to the rule of hypothetical events are definitive **if/then** statements such as the following:

*The rules are this : If a parent becomes Reclassified , the whole family does , too .*

Notice how the second part of the the if/then statement is definitive, not hypothetical (if this happens this will definitely happen). This is the only case of not actually occurring events that can be annotated as Intra-sentence causally related.

## Intra-sentence causality:

This refers to when events within a single sentence are causally related.

*When she went downstairs she stepped as carefully as she could, so as not to disturb Mr Leonard; but it was hard to be soft-footed, because of the creaking and popping of the stairs.*

We can rewrite these events using *because* statements in the following way:

*Because* the stairs were creaking and popping, it was hard to be soft-footed.

and

*Because* she did not want to disturb Mr Leonard, she went downstairs as carefully as she could.

Thus we see a causal link between events like stepping and "being soft-footed" and states of either characters (she did not want) or entities (stairs) being explicitly posited in this sentence. Notice how causality links actions and/or states. The state of not-wanting is the cause of the event of how she descends the stairs.

The above example is straightforward because it contains causal words like "because" and "so as." For most intra-statement causality this will be the case. Keep an eye out for "which" and "when" which can be subtle markers of causality (but not always!). Sometimes there won't be any markers. For example:

*There were bees buzzing around in the airs , and I liked to think of going out to search for honey.*

Why did she think of going out to search for honey? *Because* there were bees buzzing around in the airs. You would rewrite this sentence:

*Because* there were bees buzzing around in the airs, she thought about going out to search for honey.

**The best way to identify causality is to ask "why" something is happening and then see if another event in the passage answers that question.**

Pay particular attention to **compound actions**. For example:

*On the other side , they came to a flat length of ground surrounded by hills **AND** stopped to rest where there was only low brush and emptiness and a few birds holding forth .*

So you need to ask yourself "why" for each event. If you ask "why did they stop to rest?" one potential answer is "because they came to a flat length of ground surrounded by hills," i.e. something about the nature of this landscape made them want to stop. They may have stopped for *\*other\** reasons, but we could potentially infer the first event as the cause of the second event. Because there is ambiguity we will annotate this type of relationship with lower "strength" (to be discussed below). For now, just keep an eye on these types of relationships.

**For intra-sentence causality, you need to look at the relationship of all possible events to each other.**

### Inter-sentence causality:

This is a form of causality when an event in one sentence is the cause of the actions or states of an event in another sentence:

*So Jade Dragon's children went down to earth and turned themselves into water, saving the people on earth. They became the four great rivers of the land, stopping the drought and death of all those on earth.*

We can rewrite these two sentences in the following way:

*Because the children turned themselves into water, they became the four great rivers of the land.*

Again we can get this by asking ourselves, "why did they become the four greater rivers of the land?" Because they turned themselves into water.

Notice how each sentence itself also contains causal events, which we could rewrite in the following ways:

*Because they turned themselves into water, they saved the people on earth.*

and

*Because they became the the four great rivers, they stopped the drought, etc.*

**NOTE:** The causal relationship may be in **reverse order**! The following sentence may explain the causes of the prior sentence. Humans are smart, they can handle this. For example:

*The plane starts to descend , and I have this sudden panic because I just know that I 'm on the wrong plane , am traveling to the wrong place . It 's never clear where I 'm landing — in a war zone , in the midst of an epidemic , in the wrong century — only that it 's somewhere I should n't be .*

Why does the narrator have a sudden panic as described in sentence one? A) "because he knows he's on the wrong plane" (intra-statement) and B) "Because it's never clear where he's landing" (inter-statement). The second event explains the cause for the state of the first sentence.

Thus you would rewrite this twice as:

*Because it's never clear where he's landing, he has a sudden panic*

*Because he knows he's on the wrong plane, he has a sudden panic*

The way to locate causality is to ask yourself "why is this happening" and then see if an event in another sentence provides a reasonable answer to this question.

NOTE: dialogue between speakers, i.e. in separate sentences, is intrinsically causal unless proven otherwise. This means that one reasonable answer to the question, "why did this person say this" is "because this other person said something right before." It's possible that the content of the sentence makes you think otherwise, but this must be explicit (this is a reversal of our rule that causality must be explicit). Notice too that this only applies to when we have explicit "saying" events (he said, she argued). And also dialogue between two people. Whether two events in the same quotation are causally related is subject to the usual rules.

## Coherence

Statements cohere when they are "about" the same things. They don't drift to new topics or non-sequiturs (which just means something out of sequence!). The way we measure this is the extent to which entities are passed from one sentence to the next. Can you follow the sentences because they are "about" the same person/object/place?

Consider these three sentences, where we've highlighted the entities:

***She** got **home** that afternoon before all the little **kids** , which was good because **she** was n't ready to see **them** again . It had been such a freak **show** when **she** walked in last **night** . **Eleanor** had spent so much time thinking about what it would be like to finally come **home** and how much **she** missed everybody — **she** thought **they** 'd throw **her** a ticker tape parade .*

We see how the entity "she" is passed from sentence to sentence. She got home, She walked in, Eleanor had spent...Notice how the words change but the entity remains the same: sometimes she is "she" and sometimes "Eleanor."

Sometimes this will occur with synonyms (like "blade" and "sword"). We need to guess from context whether the same "thing" is being talked about. Consider this example:

*Glo asked , looking into my pot . “ Vegetable with beef broth and noodles . ” “ Are you putting any exotic herbs in it ?*

Here we see "pot" followed by "broth" followed by "it". We can infer that the same object/entity of soup in a pot is being discussed in all three sentences.

For our purposes, we will only focus on the *most re-occurring* entity, i.e. as long as one entity recurs 3 times then that is more important than an entity that recurs 2x. You will be annotating how many times the **most-frequently recurring entity** recurs in the passage (with a max of 3 for 3 sentences, 2 for two sentences, and 1 for no recurring entities in sentences).

IMPORTANT EXCEPTION: We will not consider "I" an entity. This is either the narrator or the speaker of dialogue. Narrators are omnipresent, whether in 1st or 3rd person and thus cannot contribute to coherence through their presence (they tie literally everything together...). Thus condition on all other entities in a passage besides "I."

## Annotations

The annotation structure is as follows. Remember we are aiming to annotate "explicit causality," and thus you are scanning for actually occurring events in narratives that actually cause a subsequent event to actually happen.

1. Source Texts. You will receive a directory of .txt files. Each .txt file contains a 3 sentence passage drawn from a narrative text.

2. Annotation Table. You will each receive an annotation table that you will fill in in the following way:

### a. filename

Copy paste the filename including the file extension .txt

### b. causal\_events

Include the two causal events separated by an underscore. Remember an event contains an agent and an action (or state). Think of this as an underlining problem. What sequential words are the cause of a subsequent sequence of words? **Causal event goes first, caused event goes second.** The order is important!

For example:

*If staring into its eyes is a sign of aggression , what 's a sign of submission ? My breaths are loud but steady . I sink to my knees .*

Becomes:

sign of submission\_I sink to my knees

Or:

*My family was breaking up because of me .*

me\_My family was breaking up

Simply copy paste the sequences and separate by an underscore.

**If there are multiple causes of a single caused event, then annotate these as separate event pairs, i.e. a new row for each cause/caused pair. Ditto for if a single event causes multiple things to happen. We are annotating all possible causal event pairs.**

### **c. sentence\_number**

For intra-sentence causal events, put the sentence where the causal event occurs. Either 1,2, or 3. (There should always be exactly 3 sentences per passage. If not, DO NOT annotate the passage AT ALL).

For inter-sentence causal events, put the sentence numbers in causal order. For example if an event in sentence 2 causes an event in sentence 3, then put: 2\_3. If 1 causes something in 3, then 1\_3. Remember causality can work backwards so 3\_1 is an acceptable answer.

You will put the actual causal events in the causal\_events column. Here we just want to know which sentences are you working on and linking.

If there are multiple causal pairs in a single sentence (or between sentences) it is ok to duplicate the sentence number. So if there are 2 causes of a single caused event in sentence "3" then you would repeat "3" as the sentence number for each row where you list the different causal pairs.

### **d. coherence\_score**

This is where you give the coherence score as described above.

3 = At least one entity is passed across all three sentences.

2 = At least one entity is passed across any 2 sentences (could be between 1st and 3rd sentence). 1 = all three sentences are NOT linked by any shared entities at all.

0 = use this everytime you are annotating causality (IREC/IRAC), not coherence. I.e. for every inter/intra-sentence example, put a coherence score of 0 (thus we know to ignore it).

Keep in mind that entities may be represented by different words. "Blade" and "sword" are technically the \*same\* entity, even though they are different words. If one is discussed in one sentence and the other in a subsequent sentence this is still a coherence score of 2.

### **e. causal\_type**

There are 3 causal types:

IRAC = Intra-sentence causality

IREC = Inter-sentence causality

COH = Inter-sentence coherence

### **f. strength**

This is a single measure of "necessity" and "sufficiency." Here you are asking yourself how necessary and sufficient is the prior event for the subsequent event. The scale is:

3 = very necessary

2 = medium necessary

1 = weakly necessary

**g. notes**