

Introduction: We conducted a psycholinguistic study investigating what influences whether readers recognize a stretch of text as free indirect discourse (FID). In particular, we compare the effectiveness of two kinds of FID triggers, evaluative pre-nominal adjectives (e.g. *poor girl*) and adverbials of possibility/doubt (e.g. *perhaps, probably*). We hypothesize that these cue types trigger FID through different mechanisms, and test this idea by assessing whether people's sensitivity to these triggers correlates with spatial perspective-taking abilities.

Unlike direct and indirect speech, free indirect discourse (FID) presents a character's speech or thoughts without explicit quotes or embedded clauses (ex.1a-c).

(1a) *Direct discourse:* Peter said, "I will go home tomorrow." (1b) *Indirect:* Peter said that he would go tomorrow.

(1c) *Free indirect discourse:* Peter was getting really tired of sleeping on Tim's couch. How could anyone sleep on that old thing? He would go home tomorrow. No one was going to make him change his mind about that.

FID has attracted the interest of philosophers, linguists, literary narratologists and psychologists (Banfield 1973, Fludernik 1993, Maier 2012, Schlenker 2004, i.a.). A key question is *how readers recognize a particular stretch of text as FID*, i.e., as reflecting the character's thoughts or words and not those of the narrator? A number of cues/triggers that can signal FID have been identified (e.g. McHale 1978, Fludernik 1993), including expressive/evaluative adjectives (e.g. *poor girl, damn fool*, ex.2) and adverbials of possibility/doubt (e.g. *probably, possibly*, ex.3). Both of these cues can, in principle, be interpreted (i) as the opinions/beliefs of the *narrator* (e.g. the narrator thinks someone is a 'poor girl') or (ii) as the opinions/beliefs of one of the *characters* (Mary thinks Elizabeth is a 'poor girl'). It is this latter case that constitutes FID.

(2) Mary looked woefully at Elizabeth. Poor girl; she was sick.

(3) Luke glanced at Andrew warily. He'd probably put toothpaste in the shampoo bottle again.

It is quite striking that, although many potential cues to FID have been identified, *it is not yet clear how people process FID, how effective different cues are at signaling FID, and what might underlie differences in cues' effectiveness* (Bortolussi & Dixon 2003). To the best of our knowledge, our work constitutes the first psycholinguistic investigation exploring how and how effectively different cues trigger recognition of FID and exploring their relation to spatial perspective-taking.

We investigated **two cues for FID: (i) evaluative adjectives and (ii) adverbials of doubt /possibility/certainty** (referred to as *adverbs of possibility*). Both are widely recognized as cues to FID (e.g. McHale 1978, Fludernik 1993), but very little is known about the processing of these cues, their effectiveness in naïve readers and whether they differ in their 'signaling power'. We hypothesize that **adverbs of possibility and evaluative adjectives differ in how they trigger recognition of FID:**

We suggest that **evaluative adjectives** trigger FID because they have two key properties that prompt readers to **'activate' the perspective of a character in the story**. First, the left-dislocation structure in ex.(2) – and in other similar cases of sentence-initial evaluative adjective+noun sequences – is associated with colloquial registers (e.g. Lambrecht 1994). Thus, it provides a signal to the reader that the sentence should *not* be construed as part of the *narrator's* voice, and should instead be construed as coming from one of the characters. Second, evaluative adjective+noun sequences involve an emotional, expressive component. Interpreting ex.(2) as FID asks the reader to put herself in Mary's shoes, to feel Mary's emotions for Elizabeth. It is well-known that emotions have a privileged position in human cognition. E.g., we recognize emotions rapidly and automatically (e.g. Smith 2011; see also mirror-neuron work). Put together, these observations suggest that evaluative adjective+noun constructions trigger FID because they encourage readers to 'step into the shoes' of a character. I.e., perspective-taking is a crucial part of this process.

In contrast, **adverbs of possibility** have no register cues or emotional component to encourage empathetic perspective-taking. We hypothesize that they trigger FID through a different mechanism, possibly involving **reasoning about the narrator's and characters' knowledge states**. Using an adverb to signal level of likelihood (e.g. *perhaps, probably*) indicates that the person is making a judgment about the likelihood of an event/situation, and does not know whether a particular proposition is true. We suggest that this clashes with the assumptions that we make about the knowledge state of the narrator, who is normally expected to know the storyline. As a result, encountering an adverb of possibility triggers an inference process in the reader through which they infer that the sentence is not coming from the narrator but from someone else.

In sum, the idea is that (i) evaluative adjectives trigger FID by means of a perspective-taking process, whereas (ii) adverbs of possibility trigger FID through an inference process about knowledge states, which is less directly related to perspective-taking. If this is on the right track, **we predict that general perspective-taking abilities (measured by non-linguistic tasks) should correlate with sensitivity to evaluative adjective cues, but not (or only weakly) with sensitivity to adverbials of possibility.**

Experiment: Our study has three main aims: (i) to test our hypothesis about the differences between adverbs of possibility vs. evaluative adverbs, (ii) more generally to get a sense of whether these cues differ in their ability to trigger FID, and (iii) to see whether and how FID is related to spatial perspective-taking. In our

study, people read sequences of sentences with and without FID-triggering cues (evaluative adjectives, ex.(4); adverbs of possibility, ex.(5)). Crucially, the sentences were designed such that processing the FID cue affects the resolution of the subject pronoun in the second sentence. In **plain sentences**, the pronoun is ambiguous between the preceding subject and object (Mary, Elizabeth, ex.(4a)), but in **sentences with FID triggers**, if people recognize that the cue signals FID, they should opt for the preceding object (Elizabeth, Tom).

(4a) *Plain*: Mary looked woefully at Elizabeth. She was sick. (she=Mary/Elizabeth)

(4b) *FID*: Mary looked woefully at Elizabeth. Poor girl; she was sick. (she=Elizabeth?)

(5a) *Plain*: Luke glanced at Tom warily. He'd put toothpaste in the shampoo bottle again. (he=Luke/Tom)

(5a) *FID*: Luke glanced at Tom warily. He'd probably put toothpaste in the shampoo bottle again. (he=Tom?)

Method–FID questionnaire: After reading each sentence, participants (n=36, 19 f, 17 m) indicated, on a scale of 1 to 6, who the pronoun refers to. This was done with a question, e.g. “Who was sick?”, which participants answered on a -16 scale, with the subject and object as extremes (e.g. Mary 1 2 3 4 5 6 Elizabeth). *The key questions are whether there is a stronger object preference in FID sentences than in plain sentences, and whether the strength of the object preference differs for the two cue types.* I.e., we used pronoun interpretation as a tool to see if people processed a particular sentence as FID or not. The study had 16 targets and 30 fillers.

Method–Spatial perspective-taking: We also tested whether people's sensitivity to the FID cues (i.e., their willingness to assume the perspective of the character in a narrative) is sensitive to **how good they are at spatial perspective-taking**. One could posit that people who are good at imaging themselves in different spatial locations might also be better at interpreting FID cues. To measure perspective-taking ability, participants completed the standardized *Perspective Taking/Spatial Orientation Test* (Hegarty & Waller 2004) after the FID questionnaire. In this test, people are asked to imagine different perspective/orientations in space, imagine how a scene looks from different vantage points, and to think about how their positions relate to the locations of other objects. A lower score signals better spatial perspective-taking ability (i.e., fewer errors).

RESULT#1 Sensitivity to FID triggers: Overall, we find significant effects of both cue types: The presence of evaluative adjectives and adverbs of possibility triggered a significantly higher proportion of object choices than the ‘plain’ versions of the sentences ($p < .05$ for both cue types). In other words, seemingly subtle cues such as evaluative adjectives and adverbs of possibility have clear effects on how people process discourse (shown by pronoun resolution). We also see some hints of evaluative adjectives possibly showing a stronger shift towards the object than adverbs of possibility, when compared with the matching ‘plain’ sentences (interaction, $p < .05$). This suggests that cues making reference to perspective-taking (and with an emotional component) may be more effective at triggering FID than cues relying on reasoning about other's knowledge.

RESULT#2 Relation between FID sensitivity and spatial perspective-taking: A FID Sensitivity Score was calculated for each participant by subtracting their average rating for ‘plain’ sentences for their average rating for FID sentences, and normalized for each participant. (A higher number=more sensitive to FID cues). This score has a significant correlation with participants' performance on the spatial perspective-taking task. *People who did better on the spatial perspective-taking task (fewer errors) also exhibited higher sensitivity to FID cues.* However, further analyses show that this effect does not hold for both cue types. In particular, (i) sensitivity to **evaluative adjectives** correlates with performance in the spatial perspective task ($p < .05$), but (ii) there is no significant correlation between sensitive to **adverbs of possibility** and spatial perspective-taking performance ($p > .7$). In sum, **better spatial perspective-taking ability is correlated with increased ability to make use of evaluative adjective cues, but not adverbs of possibility.** A person's willingness to interpret evaluative adjectives as reflecting the opinion/beliefs of a character in the narrative seems to be related to the ease with which that person is able to conceptualize different perspectives/orientations in space. However, the absence of a correlation for adverbs of possibility suggests that spatial perspective-taking mechanisms are not recruited when processing adverb cues. These findings are compatible with our prediction that perspective-taking abilities correlate with sensitivity to evaluative adjective cues, but not adverbials of possibility.

Conclusions: Our experiment investigated readers' sensitivity to FID from a psycholinguistic perspective, and experimentally demonstrated that seemingly subtle cues such as evaluative adjectives and adverbs of possibility have clear effects on how people process discourse (shown by pronoun resolution). Furthermore, we showed that people's sensitivity to evaluative adjectives is positively correlated with their spatial orientation and perspective-taking abilities (as measured by the spatial orientation test of Hegarty & Waller). As a whole, our findings provide **new experimental evidence regarding FID** and **suggest that different FID triggers may rely on a different linguistic processes or cognitive mechanisms.**

- Banfield 1973. *Narrative style and the grammar of direct and indirect speech.*
- Bortolussi & Dixon 2003. *Psychonarratology*
- Fludernik 1993. *The Fictions of Language and the Languages of Fiction.*
- Hegarty & Waller 2004. *A dissociation between mental rotation and perspective-taking spatial abilities*
- Lambrecht 1994. *Information structure and sentence form*
- Maier 2012. *Quotation and Unquotation in FID*
- McHale 1978. *Free indirect discourse: a survey of recent accounts.*
- Schlenker 2004. *Context of thought and context of utterance*
- Smith 2011. *Rapid Processing of Emotional Expressions*