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Anticipating the *Damn* Referent: How Comprehenders Rapidly Retrieve the Speaker's Attitude When Processing Negative Expressive Adjectives

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Abstract

Theoretical accounts of negative expressives such as *damn* have ascribed two main properties to this type of adjective, namely that they are typically speaker-oriented, and that they can be flexible with regard to their syntactic attachment. However, it is not clear what this means during online sentence processing. For example, is it effortful for comprehenders to derive the speaker's negative attitude conveyed by an expressive adjective, or is it a rapid, automatic process? And do comprehenders understand the speaker's attitude regardless of the expressive's syntactic position? The current work provides the first evidence supporting theoretical claims by investigating the incremental processing of Italian negative expressive adjectives. In an eye-tracking study, we show that expressive content is rapidly integrated with information about the speaker's attitude, resulting in the anticipation of an upcoming referent, regardless of the expressive's syntactic realization. We argue that comprehenders use expressives as an ostensive cue that allows for automatic retrieval of the speaker's negative attitude.

Keywords: Experimental pragmatics; Expressives; Negative expressive adjectives; Incremental language processing; Visual world paradigm; Eye-tracking

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1. Introduction

Negative expressive adjectives (such as *damn* or *fucking*) are quite special. Though similar on the surface to regular descriptive adjectives (such as *black* or *tall*), they exhibit properties that set them apart (see Gutzmann, 2019a; Kaplan, 1999; Potts, 2005, 2007; Schlenker, 2007). Consider example (1):

(1)   The damn dog is on the couch
    a.   The dog is on the couch
    b.   S has a negative attitude towards the dog being on the couch

When a speaker utters (1), they convey (1a), but the word *damn* additionally carries the expressive content of (1b): the comprehender learns something about the state of the world with (1a) and additionally something about the specific attitude of the speaker via (1b). This observation has led to the claim that expressive adjectives are *speaker-oriented*: the expressive content conveyed amounts to the expression of the negative attitude of an agent (typically the speaker) toward a target object, individual, or event (Potts, 2005). One particular property that seems to support the speaker-orientedness of expressives is their *attachment flexibility*: they admit nonlocal interpretations that are disjointed from the adjective's morpho-syntactic realization (Gutzmann, 2019b). For example, the interpretation in (1b) (i.e., that the speaker is upset with the dog being on the couch) can also be reached when *damn* appears before the word *couch* (see (2) below). Critically, this is not the case for any other adjective type, including evaluative adjectives (e.g., if one replaces *damn* with *ugly* in sentences (1) and (2) the meaning necessarily changes).

(2)   The dog is on the damn couch
    (2a)   S has a negative attitude towards the fact that the dog is on the couch.

These properties have been described and analyzed by theoretical semanticists throughout the last 20 years [(Potts, 2005; Schlenker, 2007; Tonhauser et al., 2013); i.a.]. However, despite the rich theoretical models, not much is known about how *speaker-orientedness* and *attachment flexibility* play out during online processing. We believe that from the main accounts of negative expressives, it is possible to derive two working hypotheses regarding their comprehension. First, that when encountering an expressive, a comprehender establishes a link between the expressive and the target of the speaker's attitude (e.g., when hearing the word *fucking*, the comprehender will ask themselves "what is the speaker so upset about?"). Frazier et al. (2015) argue that establishing such a link would require a pragmatic inference. But how and when does the comprehender understand that the expressive adjective conveys the speaker's negative attitude? This question is critical, considering how not all expressives display a speaker-oriented behavior (Amaral et al., 2007; Harris & Potts, 2009), which might indicate that understanding the expressive content is pragmatic—and not semantic—in nature. This, in turn, could translate into additional processing effort for a comprehender when linking an expressive to the speaker's attitude during comprehension.

Second, if (1) and (2) convey the same expressive content, that is, if expressives can be nonlocally interpreted, understanding the expressive's link to the speaker's attitude should

occur similarly regardless of syntactic position– cf. Bross (2021). This would be in line with the idea that expressive content is independent and constitutes a separate speech act from the utterance in which the negative expressive is embedded in, as suggested by Frazier et al. (2015). Preliminary support for this comes from Donahoo et al. (2022), who (using Event-Related Potentials) found that, when expressives are combined with a noun (*damn dog*), they elicit a different neural response relative to descriptive adjectives (*black dog*), but a similar response relative to nonsense adjectives (*flerg dog*).[AQ1] Donahoo et al. (2022) argue that the interpretation of expressives involves a "wait and see" strategy in which processing of syntactic attachment is delayed or suspended. However, this is only indirect evidence for the nonlocality of the interpretation of expressives, since Donahoo et al. (2022) did not investigate expressives with different syntactic realizations. Further, such a "wait and see" strategy might play out differently in languages (such as Italian) that typically require the adjective to carry an explicit morphological marker indicating an agreement in gender and number between an adjective and the noun that it refers to (e.g., in *maledetto cane*, Italian for *damn dog*, the suffix -o in *maledetto* agrees in gender and number with the masculine singular noun *cane*).

In short, these two points—an expressive's speaker-oriented character and its relatively loose syntactic attachment restrictions—raise important questions regarding the links between theory and processing of negative expressive adjectives. First, how and when do comprehenders link an expressive to a speaker's attitude and to the target of said attitude (if they do it at all)? Second, is this process influenced by the expressive's syntactic attachment? If so, how?

In the current work, we seek to answer these questions by studying expressives from the perspective of incremental language processing. Previous research has shown that comprehenders are adept at using their current informational stand in order to anticipate how an utterance will unfold over time (e.g., Altmann & Kamide, 1999, 2007; Tanenhaus et al., 1995). The way in which comprehenders do not or do anticipate an upcoming referent has been used to draw inferences about the mental processes involved in comprehending specific types of semantic and pragmatic information. For example, comprehenders can rapidly anticipate upcoming objects based on a verb's selectional restrictions (Altmann & Kamide, 1999), suggesting that immediately upon hearing a verb, representations corresponding to the verb's arguments are activated. In contrast, Huang and Snedeker (2009) found that the interpretation of scalar inferences (e.g., understanding the word *some* to mean *some but not all*) does not allow for the rapid anticipation of a referent, suggesting a lag between semantic and pragmatic interpretations of the word *some* (though see Breheny et al., 2013). Further, Ferguson and Breheny (2011) suggest that pragmatic information, such as knowledge of the speaker's beliefs and desires, influences expectations about the upcoming referent of a verb's argument.

With this in mind, investigating whether expressives generate anticipation effects can help us understand how comprehenders establish the link between a speaker's attitude and the expressive adjective. For instance, if expressives index the speaker's attitude, listeners should be able to rapidly link the expressive to the attitude of the speaker and to the target of said attitude in order to anticipate an upcoming referent. No such anticipation should be possible when the comprehender does not know what the speaker's attitude is. This would make the speed of activation of a speaker's attitude when processing an expressive similar to the speed of activation of thematic role structures when encountering a verb (Altmann & Kamide,

1999). Alternatively, comprehending the speaker-oriented character of negative expressive adjectives could be a resource-intensive inferential process that requires the comprehender to reason about the expressive, the sentence, and their knowledge about the speaker's attitude. This could result in added processing cost and in a failure to anticipate the intended referent, akin to the findings of Huang and Snedeker (2009) regarding scalar inferences.

Finally, investigating how the syntactic attachment of an expressive mediates potential anticipatory effects will help us further understand the link between expressives and the speaker's attitude. If expressives are nonlocally interpreted, as suggested by theoretical accounts, their specific syntactic attachment should not impact how comprehenders anticipate the object of the speaker's negative attitude when encountering an expressive.

The current work thus aims to build a bridge between theory and processing of expressive adjectives. To do this, we used an eye-tracking, visual world paradigm (Cooper, 1974; see also Huettig et al., 2011). This method provides high temporal granularity and is well suited to investigate the time-course of anticipatory effects. Importantly, we conducted our experiment on Italian, a language that typically requires explicit morphological agreement in number and gender between adjective and noun.

2. Method

2.1. Participants

Sixty-eight native Italian speakers (ages 18–35) with normal or corrected-to-normal vision participated in the experiment after giving their informed consent. This number was decided on the basis of a power analysis by simulations performed on pilot data using the R package SimR (Green & MacLeod, 2016), which determined that at least 60 were needed to detect an effect size smaller than the one eventually found in the main experiment with 80% power.

2.2. Materials

We created 10 critical items containing five different negative expressive adjectives (i.e., 2 items per expressive). Negative expressives are highly salient, so we intentionally kept the number of items low to prevent participants from developing any task-related strategy. We selected negative expressive adjectives that were uniquely tagged as "negative" and "vulgar" in the dictionary and that, in Italian, cannot be reinterpreted as positive descriptive intensifiers (as opposed to English expressions such as *fucking funny*, see Geurts, 2007 and Morzycki, 2011).

Each item consisted of a three-sentence written discourse context and a target spoken utterance. The target utterances were recorded by two native speakers of Italian (male and female). The context always set up a scenario in which two people (male and female) were introduced and said to have conflicting desires. For example, in Fig. 1, Elena wishes to buy a backpack (Competitor Referent) and Martino a hat (Target Referent). Target and competitor words were matched for gender and number. In the spoken target utterance, the speaker (always one of

CONTEXT	Elena e Martino vogliono acquistare un regalo di compleanno per una loro amica. Martino vuole acquistare un cappello.	
	Elena and Martino want to buy a birthday present for a friend of theirs. Martino wants to buy a hat	
	NEUTRAL	**SUPPORTIVE**
	A Elena piace tanto fare shopping e vorrebbe acquistare uno zaino	Elena ripete più volte che il cappello è bruttissimo e vorrebbe invece acquistare uno zaino
	Elena loves shopping and would like to buy a backpack	Elena repeats several times that the hat is very ugly and would like to buy a backpack
	Quando suona alla porta il corriere, Elena dice:	
	When the delivery man rings the door, Elena says:	
🔊)))	**IN SITU**	**EX-SITU**
	Il corriere ci ha portato **il cazzo** di cappello	***Il cazzo*** di corriere ci ha portato il cappello
	The delivery man brought us the **fucking** hat	The **fucking** delivery man brought us the hat

Fig. 1. Example of a critical item in the four conditions resulting from crossing the factors EXPRESSIVE POSITION and SPEAKER ATTITUDE.

the two people introduced in the context) describes a situation where only the Target Referent is mentioned (i.e., only the other person's desire is met).

Critically, the second context sentence either introduced a speaker's negative attitude toward the Target Referent, or had a neutral statement (Factor ATTITUDE, levels "neutral" vs. "supportive"). The first and third context sentences were identical across conditions. The spoken utterance contained an expressive that either modified the Target Referent (In-Place) or the subject of the sentence (Out-Of-Place) (Factor: EXPRESSIVE POSITION, levels: In-Place vs. Out-Of-Place). The subject of the sentence (the delivery man, in Fig. 1) was always mentioned in the context but was not depicted in the visual grid. The subject disagreed in gender and/or number with the Target and Competitor Referents in 6 out of 10 items. This means that for six items, adjective morphology was biased against anticipating the Target Referent in the Out-Of-Place conditions.

After reading the context sentences (but before hearing the target utterance), participants saw four pictures on screen representing the Target referent, the Competitor, and two distractors (see Fig. 2). We normed our critical items in two ways. First, a group of 20 participants read the contexts and critical sentences and rated them for naturalness, confirming that all critical items were perceived as natural.

Second, we made sure that, independently of the expressive adjective, there was no bias toward anticipating the Target image. We recruited 50 participants for a sentence-picture completion task. In it, they read all context and target sentences, but the target sentences were incomplete: They lacked the expressive adjective and mention of the target referent. Participants saw the four images and were instructed to select the one that would most likely represent the Target Referent. Participants overwhelmingly selected the Competitor image for all items, suggesting that they expected the speaker to mention the object that they had expressed desire for in the context, and not the opposite referent, that is, not the object represented by the Target image.
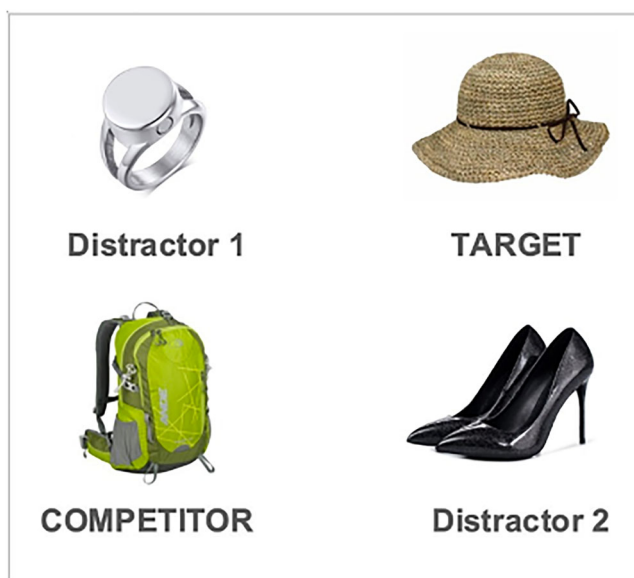
Fig. 2. Example of visual grid for a critical item.

The main experiment also contained 18 filler trials. The filler trials included sentences with negative expressives in different syntactic positions (6 items), positive expressives (6 items)—for example, *quel mito* (Engl. tr. "that legend")—and sentences without any expressives (6 items). 1/3 of the fillers mentioned three potential referents in the context, 1/3 mentioned two potential referents, and 1/3 mentioned only one.

2.3. Design

The Experiment had a 2X2, latin-square design. The factors were SPEAKER ATTI-TUDE (supportive vs. neutral) and EXPRESSIVE POSITION (In-Place vs. Out-Of-Place). SPEAKER ATTITUDE refers to whether the second context sentence provided explicit information about the speaker's negative attitude or not. EXPRESSIVE POSITION refers to whether the expressive adjective syntactically modified the correct referent, or whether it had been moved to modify an earlier constituent.

2.4. Procedure

Participants were sat in front of a computer monitor inside a soundproof booth. Eye-movements were recorded using a Tobii Pro X3-120 eye-tracker. At the beginning of the experiment, the eye-tracker was calibrated using a 5-point calibration procedure. After calibration, participants went through two practice trials (which did not contain expressives). They then saw the 10 critical trials and 18 filler trials, pseudo-randomized so that there were never two critical trials in a row. In each trial, participants first read the context sentences, after which they pressed the SPACEBAR. They then saw the four images exemplified in Fig. 2. The
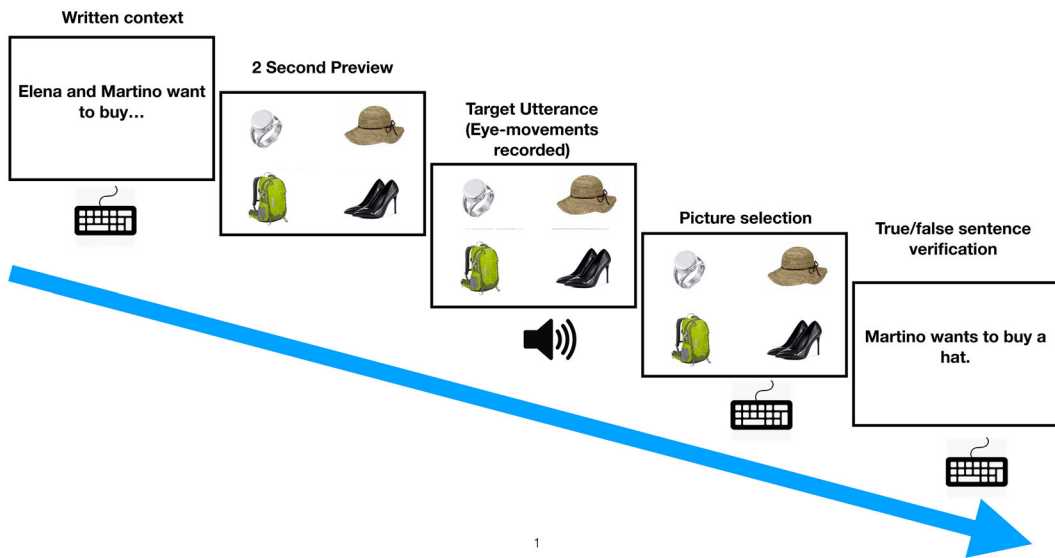
Fig. 3. Schematic depiction of the progression of an experimental trial.

images (whose position on the screen was randomized) were on display for 2 s before the target sentence began playing through a set of speakers in front of the participants. After the target sentence had finished playing, participants selected which of the images best matched the end-result of the story (context + target sentence) using one out of four keys in front of them. They then performed a sentence verification task probing them on information about context and target sentences. Responses in the verification task were used as an exclusion criterion: Participants needed to respond accurately in at least 80% of all trials. The procedure is illustrated in Fig. 3.

2.5. Analysis

All our materials, data, and analysis script are available on the project's OSF repository: https://osf.io/dwc25/?view_only=59bfcfde467d4ab59faaee06a6a2d255. Prior to analysis, trials in which participants selected the incorrect image were removed. Then, six participants were removed for not achieving at least 80% accuracy in the sentence verification task, and two more were removed for failing to meet our inclusion criteria. This left the total number of participants at 60. The remaining data were preprocessed using the R package eyetrackingR (Dink & Ferguson, 2015).

We calculated the proportion of fixations on each of the four images for every 20 ms time bin. We then time-locked the proportion of looks to the beginning of the expressive adjective and created a time-window that lasted until the onset of the next word. We ran a mixed-effects, logistic regression analysis for the entire time-window. This model included SPEAKER ATTITUDE and EXPRESSIVE POSITION as fixed effects (sum-contrast coded) together with their interaction, and random effects by items and by participants for both main

Table 1

Results of logistic regression model when hearing the expressive

Term	$\hat{\beta}$	95% CI	z	p
Intercept	0.05	[−0.60, 0.71]	0.15	.880
SPEAKER ATTITUDE	−1.82	[−2.99, −0.66]	−3.06	.002
EXPRESSIVE POSITION	0.02	[−0.68, 0.72]	0.05	.957
SPEAKER ATTITUDE x EXPRESSIVE POSITION	−0.44	[−1.99, 1.12]	−0.55	.580

Note. the results represent looks throughout the entire region.

effects and their interaction. The dependent variable was proportion of looks to Target picture. We then performed a cluster-based permutation analysis (Maris & Oostenveld, 2007) in order to assess the time-course of the effect of SPEAKER ATTITUDE. This type of analysis involves multiple steps. First, we fitted individual mixed-effects logistic regression models on each 20 ms time-bin. These models included SPEAKER ATTITUDE as fixed effect and random intercepts and slopes for SPEAKER ATTITUDE by items and by participants.

Then, we determined potential clusters of effects, judging by the number of contiguous time-bins that showed a significant effect of SPEAKER ATTITUDE (*t*-value>2). Finally, in order to assess whether such clusters could occur by chance, we conducted a nonparametric permutation test on the same data 1000 times. For the permutation test, we randomly permuted the condition labels by subjects. We then extracted *p*-values for our clusters by determining how likely it would be to find a cluster by chance (i.e., in the permuted samples) that was at least as big as the one found in the original data analysis. In practice, this meant counting the number of times that a cluster as big or bigger than the one found in the actual experiment occurred in the 1000 datasets for which the condition labels were randomly permuted within subjects (for a thorough description of the permutation technique, see Ito & Knoeferle, 2022). The logic of this analysis relates to the theoretical claims made in the literature regarding the "speaker-orientedness" and nonlocality of expressive adjectives. First, if understanding an expressive adjective involves automatically retrieving the speaker's attitude, we should find a main effect of SPEAKER ATTITUDE, with significantly more looks to target on the "supportive" relative to "neutral" condition, resulting in a large cluster of anticipatory eye-movements prior to the onset of the following word. Second, if the nonlocality of expressive adjectives means that the speaker's attitude can be equally retrieved regardless of syntactic position, we should find no interaction between SPEAKER ATTITUDE and EXPRESSIVE POSITION, and no difference between the "supportive-In-Place" and "supportive-Out-Of-Place" conditions.

2.6. Results

The model on the entire time-window showed a main effect of ATTITUDE (*z*-value 3.064, *p*=.00219) on proportion of looks to Target Picture. There was no effect of EXPRESSIVE POSITION and no interaction between the two factors. The results are shown in Table 1 and Fig. 4. A follow-up post-hoc model was conducted including the between-item factor
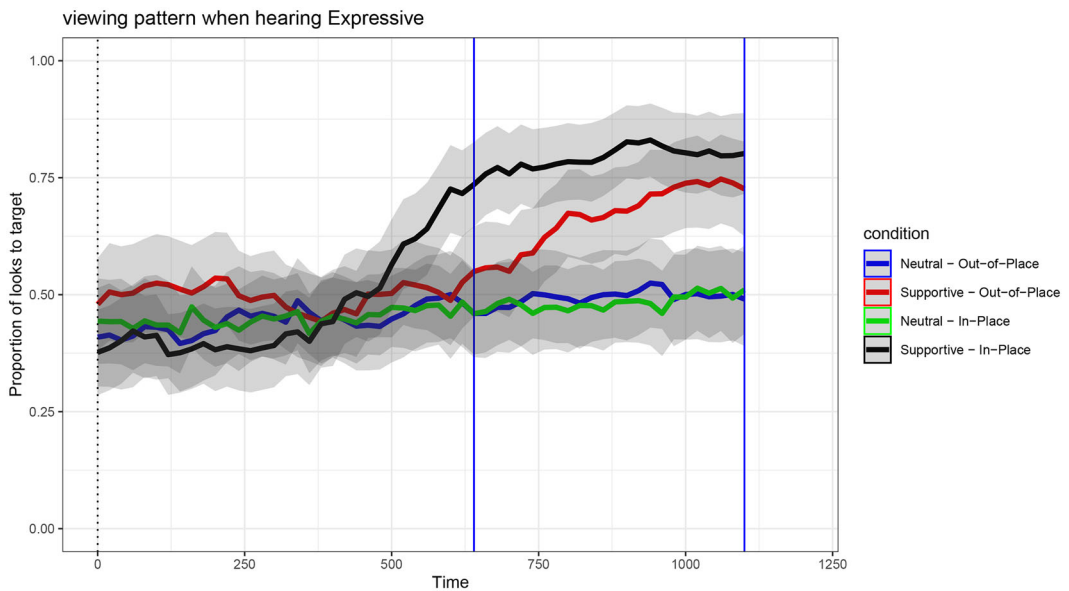
Fig. 4. Proportion of looks to target when hearing the expressive adjective. Blue lines show beginning and end of significant cluster for main effect of SPEAKER ATTITUDE. Error bars show confidence intervals.

MORPHOLOGY ("match" vs. "mismatch") to test if the absence of an interaction effect was caused by the four critical items for which the subject noun had the same adjectival morphological marking as the Target and Competitor nouns. This model showed no significant difference between the two groups of adjectives, and no significant three-way interaction.

The cluster-based permutation analysis confirmed the main effect of SPEAKER ATTITUDE, showing a large cluster of differences between "supportive" and "neutral" conditions starting at 640 ms after onset of the expressive and continuing until the end of the region. Critically, the delayed start of the cluster (relative to word onset) suggests that the anticipatory looks were caused by processing and integrating the expressive adjective and did not represent a bias that preceded hearing the word. Beginning and end of this cluster are marked in blue in Fig. 4. The direct comparison between the "supportive-In-Place" and "supportive-Out-Of-Place" conditions using a cluster-based analysis approach showed no significant clusters of differences, further suggesting that throughout the entire region, there was no moment in which anticipation caused by processing the expressive differed as a function of syntactic position.

3. Discussion

In the current study, we investigated how processing negative expressive adjectives is integrated with prior knowledge of the speaker's attitude. First, we assessed whether the expressive could be linked to the speaker's attitude fast enough for participants to anticipate the

attitude's target. Second, we evaluated whether the syntactic position of the expressive would impact how a referent is anticipated.

The results suggest that negative expressive adjectives are rapidly integrated with information about the speaker's negative attitude regardless of whether the expressive syntactically modified the Target Referent or not. This interpretation is further strengthened by the fact that anticipation effects emerged when the expressive adjective syntactically modified a constituent different to the Target Referent. Anticipation even took place when the expressive adjective mismatched the Target Referent morphologically. This supports the idea that processing the morpho-syntactic properties of expressives might be delayed or suspended, resulting in a "wait and see" strategy (Donahoo et al., 2022). It could be argued that the effect of SPEAKER ATTITUDE could be attributed to utterance-specific properties alone such as prosody. In this alternative account, participants could have anticipated the attitude of the speaker based solely on the intonational contours of the words, and not on the meaning of the expressives. We see this as rather unlikely. First, we did not record the sentences using any particularly marked intonational patterns. Second, and more importantly, the utterances were identical in both context conditions and yet there was no anticipation of the referent in the "neutral context" conditions. It was the critical information regarding the speaker's attitude toward the referent in the "supportive context" condition that triggered eye-movements to the Target. Finally, though prosodic information (such as intensity and mean and maximum pitch) has been found to correlate with emotional speech (Hirschberg, 2004; Liscombe et al., 2003), it does not seem to be a good enough cue when recognizing speaker emotion in an experimental setting (Garrido et al., 2012).

Various questions remain unanswered given the current results. For example, what about cases in which expressive adjectives are used as intensifiers with a positive valence (e.g., *that joke was fucking funny*)? Though this does not play a role for the current investigation (since this reading is hardly possible for Italian expressive adjectives), it remains to be seen whether or not the availability of such interpretations in other languages would result in a different pattern of results. Specifically, whether the availability of a positive intensifier meaning of expressive adjectives in other languages restricts the amount of anticipation of the referent that maps onto a speaker's negative attitude. Further, it remains to be seen whether the current results would hold under more stringent conditions in which different visual referents could draw the participant's visual attention (e.g., if there was a picture of the delivery man presented with the utterance shown in Fig. 2), would expressives still display the same level of attachment flexibility? It is also necessary to investigate the potential way in which prosody might strengthen or hinder anticipation based on integrating expressive adjectives with information about the speaker's attitude. We leave these questions for future research.

In conclusion, our study is the first empirical work showing what it means, from a sentence processing perspective, for expressives to be speaker-oriented and flexible regarding their syntactic attachment. We see this as providing support for semantic theories that view these two aspects as key for the interpretation of negative expressive adjectives. We propose that, during processing, if the context is sufficiently supportive, expressives are understood as indices of the speaker's attitude: Comprehenders use the expressive as an ostensive

cue that they link with the speaker's perspective, regardless of morpho-syntactic agreement and of syntactic position of the adjective.

Conflict of interest

The authors have no competing interests to declare.

Data Availability Statement

All materials, data, and analysis scripts are available on the project's OSF page: https://osf.io/dwc25/?view_only=59bfcfde467d4ab59faaee06a6a2d255

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