

Saying and shaking ‘No’

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The particle ‘No’ is the prime means for expressing negation in discourse. Probably its most prominent use is answering a polar question:

- (1) a. A: (1) Do you want some coffee? / (2) You don’t want some coffee?
b. B: No

Also a head shake can be used in this context, either in addition to or instead of ‘No’ (Kendon, 2002):

- (2) a. A: (1) Do you want some coffee? / (2) You don’t want some coffee?
b. B: (No) head shake

A head shake can be used by a speaker to emphasize negative utterances. An example is given by Bill Clinton in (3).¹ Note that three chunks of head shake gestures are produced, one for each of the negated verbal sub-utterances (*never ... not ... never*). Repetition seems to be used as a temporal means of aligning head movements and the scope of negation.

- (3) *I never told anybody to lie* (.) *not a single time* (..) *never*
[repeated head shake] (.) [repeated head shake] (..) head shake

Furthermore, a head shake can be *dissociated* from its accompanying speech, an assumption argued for in some detail with respect to speech laughter by (Mazzocconi, Tian and Ginzburg, 2020):

- (4) (*Context: Claims that B stole 500€*)
a. B: They say I stole the money. I didn’t.
b. A: I believe you.
headshake

One can understand A as both verbally expressing his belief in B’s protestation of innocence, whereas the head shake affirms the negative proposition B makes \neg Stole(B,500€) (when related to the second sentence uttered by B), or expresses that A is upset about what ‘they’ did (when related to B’s initial uttered sentence—what we refer to as a *noetic* use). However, a story on head shaking also has to provide an explanation on a contradictory rendering of A’s utterance in (4b): A provides a positive proposition believe(A,B), which the head shake negates, hence a contradiction ensues.

Requirements. In order to account for the uses of head shake and ‘No’ observed above (Kendon, 2002 mentions eight uses) in terms of linguistic theory, one needs at least

- a dialogical framework that defines speakers and illocutionary interactions,
- distinguishes negative and positive propositions,
- offers a means for representing appraisals (noetics),
- and provides access to the exophoric context.

¹The speech can be retrieved from the University of Virginia’s Miller Center of Public Affairs, where the relevant section starts around 6 min 33 sec: <https://millercenter.org/the-presidency/presidential-speeches/january-26-1998-response-lewinsky-allegations>.

Background. The simplest model of context, going back to Montague (1974) is one which specifies the existence of a speaker, addressing an addressee at a particular time. This can be captured in terms of the type in (5).

$$(5) \quad \left[\begin{array}{l} \text{spkr} \quad : \quad \textit{Ind} \\ \text{addr} \quad : \quad \textit{Ind} \\ \text{u-time} \quad : \quad \textit{Time} \\ \text{c}_{\text{utt}} \quad : \quad \text{addr}(\text{spkr}, \text{addr}, \text{u-time}) \end{array} \right]$$

However, over the last decades it has become clearer how much more pervasive reference to context in interaction is. The visual situation is a key component in interaction from birth (see Tomasello, 1999, Chap. 3). Expectations due to illocutionary acts—one act (querying, assertion, greeting) giving rise to anticipation of an appropriate response (answer, acceptance, counter-greeting), also known as adjacency pairs (Schegloff, 2007). Extended interaction gives rise to shared assumptions or *presuppositions* (Stalnaker, 1978), whereas epistemic differences that remain to be resolved across participants—*questions under discussion* are a key notion in explaining coherence and various anaphoric processes (Ginzburg, 2012; Roberts, 1996). These considerations among several additional significant ones lead to positing a significantly richer structure to represent each participant’s view of publicized context, the *dialogue gameboard* (DGB), whose basic make up is given in (6), following the recent version including *mood* described by Ginzburg, Mazzocconi and Tian (2020):

$$(6) \quad \text{DGBType} := \left[\begin{array}{l} \text{spkr} \quad : \quad \textit{Ind} \\ \text{addr} \quad : \quad \textit{Ind} \\ \text{utt-time} \quad : \quad \textit{Time} \\ \text{c-utt} \quad : \quad \text{addressing}(\text{spkr}, \text{addr}, \text{utt-time}) \\ \text{facts} \quad : \quad \textit{Set}(\textit{Prop}) \\ \text{vis-sit} \quad = \quad \left[\text{foa} \quad : \quad \textit{Ind} \vee \textit{Sit} \right] : \textit{RecType} \\ \text{pending} \quad : \quad \textit{List}(\textit{LocProp}) \\ \text{moves} \quad : \quad \textit{List}(\textit{IllocProp}) \\ \text{qud} \quad : \quad \textit{poset}(\textit{Question}) \\ \text{mood} \quad : \quad \textit{Appraisal} \end{array} \right]$$

Here *facts* represents the shared assumptions of the interlocutors—identified with a set of propositions. *Vis-sit* represents the visual situation of an agent, including his or her focus of attention (*foa*), which can be an object (*Ind*), or a situation or event (*Sit*). The remaining fields concern locutionary and illocutionary interaction: Dialogue moves that are in the process of being grounded or under clarification are the elements of the *pending* list; already grounded moves are moved to the *moves* list. Within *moves* the first element has a special status given its use to capture adjacency pair coherence and it is referred to as *LatestMove*. The current question under discussion is tracked in the *qud* field, whose data type is a partially ordered set (*poset*). *Mood* tracks public displays of emotion, crucial for *inter alia* laughter and smiling (Ginzburg, Mazzocconi and Tian, 2020). *Mood* will be needed in order to model noetic negation. The value of mood is a structure of type *Appraisal*, which is built after the *Component Process Modell* of Russell (2003):

$$(7) \quad \text{Appraisal} := \left[\begin{array}{l} \text{pleasant} \quad : \quad \left[\begin{array}{l} \text{pred} = \text{pleasant} : \textit{EmotivePred} \\ \text{affect} : \left[\begin{array}{l} \text{pve} \quad : \quad \mathbb{N} \\ \text{nve} \quad : \quad \mathbb{N} \end{array} \right] \end{array} \right] \\ \text{responsible} \quad : \quad \textit{RecType} \\ \text{power} \quad : \quad \left[\begin{array}{l} \text{pred} = \text{powerful} : \textit{EmotivePred} \\ \text{control} : \mathbb{N} \end{array} \right] \end{array} \right]$$

Basically, (7) captures the degree of pleasantness of an agent towards an emotion-triggering responsible record type, which can be either positive (*pve*, pleasant) or negative (*nve*, unpleasant). The scalar predicate *powerful* specifies the

degree of self-control an agent possesses in relation to the trigger. Appraisal is updated according to *PleasantnessInc*, where the polarity of the update depends on the value of δ :

$$(8) \quad \text{PleasantnessInc} := \left[\begin{array}{l} \text{pre: } [\text{LatestMove.cont} = \text{Assert}(\text{spkr}, \text{Amaze}(\text{spkr}, p, \delta)) : \text{IllocProp}] \\ \text{effect: } [\text{PleasantnessIncr}(\delta, \epsilon)] \end{array} \right]$$

Analysing head shake uses. For representing head shakes we adopt the simple but useful representation format presented by Crasborn (2014), where head movements are transcribed along three dimensions, *Type*, *Start direction*, *Repetition*:²

$$(9) \quad \begin{array}{|c|c|c|} \hline \textit{Type} & \textit{Start direction} & \textit{Repetition} \\ \hline \text{N(od), S(hake)} & \text{L(ef), R(ight)} & 1, 2, 3, \dots \in \mathbb{N} \\ \hline \end{array}$$

For instance, shaking the head seven times in a row where head movement initiates to the head shakers’ right side is glossed ‘SR7’ (which is what Clinton does in his first head shake repetition in (3)).

Lexical entries and phrasal rules are construed as types for interaction, they refer directly to the DGB via the field *dgb-param*. In particular, all signs have *dgb-params* that include the addressing condition (5). For instance, the lexical entry for the head shake that answers a polar question as in (2) virtually is the same as the lexical entry of ‘No’ used in that way, too, and following Tian and Ginzburg (2016), is given in (10).

$$(10) \quad \left[\begin{array}{l} \text{shape} = \text{S}_{xy} : \textit{HeadMovement} \\ \\ \text{dgb-params} : \left[\begin{array}{l} \text{spkr} : \textit{Ind} \\ \text{addr} : \textit{Ind} \\ \text{u-time} : \textit{Time} \\ \text{c1} : \text{addr}(\text{spkr}, \text{addr}, \text{u-time}) \\ p : \textit{Prop} \\ \text{MaxQUD} = p? : \textit{PolarQuestion} \end{array} \right] \\ \\ \text{content} = \text{Assert}(\text{spkr}, \text{addr}, \text{u-time}, \text{NoSem}(p)) : \textit{IllocProp} \end{array} \right]$$

Here ‘S’, following (9), represents the decisive feature of a shaking movement performed by the head, *x* and *y* under-specify its start direction and repetition, respectively. We are not aware of any evidence that the start direction of a head shake has any semantic effect. Repetition leads to obvious emphasis. However, following work on manual co-speech gesture (Harrison, 2010), repetitions can temporally align head shakes with verbal negation scope, as observed in (3).

The semantics of ‘NoSem(*p*)’ is sensitive to the polarity of the proposition it applies. To this end, positive (*PosProp*) and negative (*NegProp*) propositions have to be distinguished. If a negative particle (*not*, *no*, *n’t*, *never*, *nothing*) is part of the constituents of a proposition $\neg p$, then $\neg p$ is of type *NegProp* ($\neg p : \textit{NegProp}$). The corresponding positive proposition, the one with the negative particle removed, is *p* ($p : \textit{PosProp}$). Both positive and negative propositions are of type *Prop(osition)* (formally, $\textit{PosProp}, \textit{NegProp} \sqsubseteq \textit{Prop}$). With this distinction at hand, *NoSem* works as follows:

$$(11) \quad \text{NoSem}(p) = \begin{cases} \neg p & \text{if } p : \textit{PosProp} \\ p & \text{if } p : \textit{NegProp} \end{cases}$$

(Note that the result of ‘NoSem(*p*)’ is always of type *NegProp*.)

The other uses of “No” discussed by Tian and Ginzburg (2016) are called “‘No’ with exophoric antecedent” and “‘No’ with implicit antecedent”. Both uses are exemplified in (12) and (13), respectively. The adult speaker in (12) indicate their negative appraisal/classification (Scherer and Ellgring, 2007; Barrett, 2017) of the events. Hence, the negation particle involves an exophorically provided antecedent (namely the event).

²We adopt only the kinematic representation, not the functional one since the latter is absorbed by our semantic representations. A complete head movement is one instance of a back-and-forth rotation around an axis (vertical in case of nodding, horizontal in case of head shaking).

(12) (*A child is about to touch a socket*) Adult: No!

B in the discourse in (13) makes A think that B split with his or her girlfriend (13b). A develops a corresponding belief (13c). This belief $p = \text{that the girlfriend and B split}$ is the argument (implicit antecedent) of B's negation (13d), that is, $NoSem(p)$.

- (13) a. A: How's your girlfriend?
 b. B: She is no longer my girlfriend.
 c. A: Ah, I'm sorry.
 d. B: No, she is my wife now.

Both occurrences of *No* in (12) and (13) have already been described by Tian and Ginzburg (2016). They can be replaced by the head shake without a change in meaning. Hence, there is evidence that the head shake and the particle 'No' are both form variants of the same lexical resources (this in cultures where the head shake is associated with negation and not with affirmation, as it is in Bulgaria and, with some modifications, Greece, Turkey, and Southern Italy; Jakobson, 1972). It seems that the conjecture of Kendon (2002), namely that the uses of the head shake all share a negative kernel, can be corroborated. However, we think that the situation is more complicated due to noetic uses. Such uses stand out since they appeal to expressing attitudes. And here we observe both, head shake triggered by negative *and* positive appraisal. The negative use is verbally expressed by 'I can only shake my head at that' and is exemplified in (14).

(14) (*A tennis player is throwing a ball at the ball kid*) Have you seen this? What a shame! [head shake]

The head shake in (14) signals that the speaker evaluates the observed situation in a negatively way. Positive appraisal is exemplified in (15):

(15) (*A tennis player serves the 7th ace in a row*) Wow! What a player! [head shake]

The head shake in (15) expresses amazement concerning the athletic achievement. So it can be understood as a way of signalling disbelief. Disbelief in turn *is* a notion which rests on some sort of negation, corroborating Kendon's conjecture at first glance. However, the disbelief is rooted in a rather positive mood. Both uses, positive and negative amazement, can be captured in a single lexical but underspecified entry (we simplify over power which does not seem to contribute much here):

(16)
$$\left[\begin{array}{l} \text{form : headshake} \\ \text{dgb-params : } \left[\begin{array}{l} \text{spkr : } Ind \\ \text{vis-sit : } \left[\text{foa : } Rec \right] \\ \delta : Int \\ \text{c2 : } Arousal(\delta, form) \\ L : Type \\ p = \left[\begin{array}{l} \text{sit = foa} \\ \text{sit-type = L} \end{array} \right] : Prop \end{array} \right. \\ \text{cont = } Amaze(\text{spkr}, p, \delta) : Prop \end{array} \right]$$

Depending on the polarity of δ , the update of publicly displayed face according to (8) will be positive or negative. The basic treatment we have sketched here for headshaking applies to laughter, smiling, and related facial gestures. Ginzburg, Mazzocconi and Tian (2020) argue that laughter and smiling have two basic meanings, one that expresses the incongruity of an event, the other that an event is pleasant for the speaker. From the noetic head shakes we can make the prediction that laughter will only co-occur with positive head shake—a testable prediction of the account of negation in discourse presented here. Finally, it is noteworthy that the full parallelism between 'No' and head shake breaks down with noetic uses: in examples such as (14) or (15) it seems to be possible to say 'No' *before* the amazed *What a . . .* interjection, but not *after* it. In speech the attitude seems to have to precede its object, while in multimodal interactions both can be uttered simultaneously.

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