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Extended Abstract: Modelling topics and topic shifts in dialogue

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Topics play an important role in coherence in dialogue, as what is currently discussed constrains the possible contributions of the participants, and initiating a topic while the previous one is still under discussion may be confusing without appropriate signals. However, how to actually define the notion of topic is debated in linguistics and not sufficiently discussed in dialogue modelling.

A precise description of topics and topic shifts in conversation would contribute to understanding what it is we perceive when we judge a sequence of utterances to be coherent. In particular, having more understanding of the notion of topic is important to account for language use which does not conform to our intuitions about topical coherence, such as can be found in interactions involving for example patients with schizophrenia. In patients interaction we often see difficulties to produce a coherent speech from the ordinary listener's point of view. These difficulties can manifest at topic level where patients would use fewer markers to indicate a topic shift, or use unusual topical links such as sound similarity between two different concepts. Formalising topic transitions, and in particular more unusual ones, would thus contribute to identifying cues to support diagnosing schizophrenia. Moreover, it could help virtual assistants create smooth transitions between unrelated topics and therefore appear more natural.

The word *topic* can refer to several concepts in the literature. Topics were considered both at the sentence level (Bolinger, 1952; Firbas, 1964; Givón, 1983; Halliday, 1967) and at the discourse level (Schieffelin and Keenan, 1976; Brown and Yule, 1983). A *sentence topic* is an element of the sentence, usually a noun phrase, that the sentence comments on (Hockett, 1958). *Discourse topics*, on the other hand, are not necessarily explicit. They refer to what a piece of discourse is about, though the formalisation of this "aboutness" is debated. Discourse topics have been defined as based on the "question of immediate concern" (Keenan, Schieffelin, and Platt, 1983), explicitly stated or not, or as "the proposition or set of propositions that the question of immediate concern presupposes" (Schieffelin and Keenan, 1976). These definitions assume that a topic can be described in a unique way which raises several issues. Firstly, describing a topic can be done in several ways and determining the right question, proposition or set of propositions characterising a piece of dialogue would require an evaluation method (Brown and Yule, 1983, p. 72). Considering paraphrases of a representation as equivalent could solve this problem but a second issue remains. Indeed, each participant in a dialogue can have a different representation of what the conversation is about, which means that one representation per participant would be necessary to account for topics in a dialogue model.

In this paper we discuss a model of topics and topic shifts, including more unconventional topic shifts as we can see in dialogues with patients with schizophrenia. We will use TTR, a type theory with records (Cooper, 2014; Cooper, 2022) with *dialogue gameboards* (DGBs) (Ginzburg, 2012). This theory enables us to represent both the linguistic and extralinguistic context (situational context), which influence dialogue participants with regard to topic shifts and the evolution of the current topic but also to the *understanding* of topic shifts.

Topic shifts mostly happen for three reasons: the content of the dialogue gives an idea to a participant (*e.g.*, remembering an anecdote related to the current topic), the situational context changes and/or provides something to speak about (*e.g.*, someone is coming who should not hear the current conversation, some noise interrupts the dialogue and participants comment on it, ...), or a participant has a specific agenda and shifts the topic, potentially abruptly, to fulfil it. In all these cases, the other participants must understand that the topic is changing to prevent disruptions in the dialogue.

There are different ways to identify a topic shift. Explicit linguistic cues such as dialogue markers (Schiffrin, 1987; Fraser, 1990; Hirschberg and Litman, 1993) or phrases ("Speaking about", "Let's talk about", "On another topic", ...) are the most straightforward way to signal a topic shift. The situational context can be explicit enough for participants to pick out a topic shift without additional signals. Moreover, dialogue participants expect the other's interventions to be relevant (Grice, 1975), which can lead them to assume that an utterance starts a new topic if it seems unrelated to the preceding utterances. All these cues should be accounted for by our model, where a detailed representation of the linguistic content and situational context enables the definition of update rules explaining the topic shifts. Normally we would expect utterances within the same topics to be pragmatically linked with rhetorical rela-

tions or topoi (Breitholtz, 2021). However, there are situations where it does not happen. Consider the following example (Amblard, Musiol, and Rebuschi, 2011), where a psychologist interacts with a patient with schizophrenia. As we can see with A127, the therapist expects a pragmatic link between B124 and B126 which he interprets as a similarity between the meaning of "lose" in B124 and a figurative meaning of "dead" in B126. But the patient refutes this interpretation in B128, where he uses the word "dead" with its literal meaning. This suggests that "dead" was already used literally in B126 and that the patient used the figurative meaning of "dead" to link the topics in B124 and B126.

B124: Oh yeah (↑) and complicated (↑) and it's really very very complicated (→) politics, it's really something when you get into it, have to win or else when you lose, well, you're finished (↓) (Fr. *Oh ouais (↑) et pis compliqué (↓) et c'est vraiment très très compliqué (→) la politique c'est quelque chose quand on s'en occupe faut être gagnant parce qu'autrement quand on est perdant c'est fini quoi (↓)*)

A125: Yes (Fr. *Oui*)

B126: JCD is dead, L is dead, P is dead uh (...) (Fr. *J. C. D. est mort, L. est mort, P. est mort euh (...)*)

A127: So you think they're dead because they lost (↑) (Fr. *Ils sont morts parce qu'ils ont perdu à votre avis (↑)*)

B128: No they won but if they're dead, it's their disease well it's it's (→) (Fr. *Non ils gagnaient mais si ils sont morts, c'est la maladie quoi c'est c'est (→)*)

We propose a model that allows for these unconventional topic shifts, based on other links than the obvious pragmatic ones.

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