We study **topic-based communication** between **agents** and its **strategic** version

(Arbitrary) Partial Communication

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1. Partial (Topic-Based) Communication

Let $M = \langle W, R, V \rangle$ be a *model* with $R_{\mathtt{G}} := \bigcap_{\mathtt{k} \in \mathtt{G}} R_{\mathtt{k}}$, $\sim^M_\varphi := ([\![\varphi]\!]^M \times [\![\varphi]\!]^M) \cup ([\![\neg\varphi]\!]^M \times [\![\neg\varphi]\!]^M)$, $R^{\mathtt{S}:\chi!}{}_{\mathtt{i}} := R_{\mathtt{i}} \cap (R_{\mathtt{S}} \cup \sim^M_\chi)$, and $M_{\mathtt{S}:\chi!} = \left\langle W, R^{\mathtt{S}:\chi!}, V \right\rangle$. The semantics of $\mathcal{L}_{\mathtt{S}:\chi!}$ is as follows:

$$
\begin{array}{lll}
(M,w) \Vdash \mathrm{D}_{\mathtt{G}}\, \varphi & \text{iff} & \forall u \in W : R_{\mathtt{G}} wu \text{ implies } (M,u) \Vdash \varphi \\
(M,w) \Vdash [\mathtt{S}\colon \chi!]\, \varphi & \text{iff} & (M_{\mathtt{S}:\chi!}, w) \Vdash \varphi
\end{array}
$$

Results. **(1)** Axiomatisation of $\mathcal{L}_{\mathtt{S}:\chi!}$ is **sound and complete** via reduction axioms.
(2) Model Checking is in P.
(3) $\mathcal{L}_{\mathtt{S}:\chi!}$ is **as expressive as** *public announcement logic*, but their *update expressivities* are **incomparable**.

2. Arbitrary Partial Communication

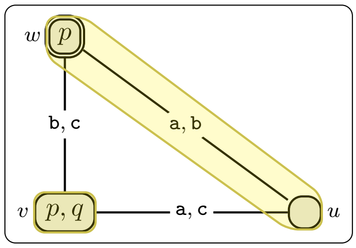
The language $\mathcal{L}^*_{\mathtt{S}:\chi!}$ extends $\mathcal{L}_{\mathtt{S}:\chi!}$ with a modality $[\mathtt{S}\colon *!]$.

$$(M,w) \Vdash [\mathtt{S}\colon *!]\, \varphi \quad \text{iff} \quad \forall \chi \in \mathcal{L} : (M_{\mathtt{S}:\chi!}, w) \Vdash \varphi$$

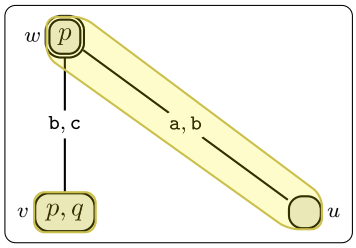
Results. **(1)** An **infinitary** axiomatisation of $\mathcal{L}_{\mathtt{S}:\chi!}$ is **sound and complete**.
(2) Model Checking is PSPACE-complete.
(3) $\mathcal{L}_{\mathtt{S}:\chi!}$ is **incomparable** to *arbitrary public announcement logic*.

Examples

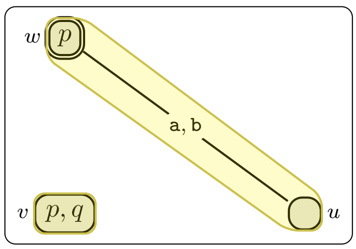
Initial model M with highlighted $\sim^M_{p\to\neg q}$



Example 1: agents b and c communicate on topic $p \to \neg q$ with the resulting model $M_{\{\mathtt{b},\mathtt{c}\}:\, p\to\neg q!}$:



Example 2: all agents communicate on topic $p \to \neg q$ with the resulting model $M_{\{\mathtt{a},\mathtt{b},\mathtt{c}\}:\, p\to\neg q!}$:



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