From Controversy to Consensus: Modelling Community-Sensitive Common Ground Management in German Discourse Markers

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This study investigates three German discourse markers, which we label *consensus markers—soviel ich weiß* ('as far as I know'), *ja* (roughly 'as you know'), and *bekanntlich* ('as is well known'). We hypothesise that their use reflects how readily a proposition p can be presented as settled support for a recommendation q, given the proposition, the relevant epistemic community, and the speaker's communicative goal. We formalise this interaction in a probabilistic pragmatic model that estimates marker-specific felicity conditions from production choices and predicts listeners' inferences about speaker goals and downstream adoption.

(1) Impfungen sind (soviel ich weiß/ ja / bekanntlich) sicher und wirksam; deshalb solltest du dich impfen lassen.
'Vaccinations are, as far as I know / as you know / as is well known, safe and effective; therefore you should get vaccinated.'

With *soviel ich weiß*, the speaker restricts p to their own epistemic state; *ja* presents p as shared with the addressee; and *bekanntlich* presents p as more broadly publicly accessible knowledge. Three factors determine the felicity of each marker. **Propositional controversy** captures how controversial p is independently of the immediate discourse context. **Community-relative controversy** captures whether p is treated as settled in the relevant community: vaccination safety and efficacy may be settled among medical experts while remaining contested in a divided public setting. **Speaker goal strength** captures the speaker's incentive to present p as settled support for q; a political group promoting vaccination, for instance, may use this presentation to strengthen its recommendation. By selecting a consensus marker, the speaker can therefore manage the status of p in the common ground and guide the addressee toward accepting q. We use the label *consensus markers* functionally: the three expressions differ in syntactic category and lexical meaning, but all bear on how p is managed in the common ground. Previous work on German discourse particles treats *ja* as contributing non-truth-conditional, use-conditional meaning [1, 2]. Its common-ground effect has been characterised as marking p as KNOWN [3], speaker-assumed common knowledge [4], uncontroversial [5–7], settled in the common ground [8], or available for use in convincing an interlocutor [9]. Recent experimental work further links *ja* to causal discourse contexts [10], which motivates the running setup in (1), where p serves as the premise for the downstream recommendation q. What remains missing is a formal account of marker felicity that integrates community-relative consensus around p with the speaker's communicative goal in presenting p as support for q.

Model.[2] Building on these insights, we propose a utility-based, noisy-threshold model within probabilistic pragmatics [13–15]. The model locates marker use conditions on a one-dimensional latent utility scale that represents how readily p can be presented as settled support for q. Perceived controversy combines propositional and community-relative components, $pc = pc_{\text{prop}} \cdot pc_{\text{prag}}$, and enters a utility $U(pc, g) = -w_{pc} \cdot pc + w_g \cdot g - w_{int} \cdot pc \cdot g$, where g is the speaker's goal strength. Low controversy and high goal strength jointly favour stricter thresholds, while w_{int} captures the additional cost of invoking consensus under high controversy. Each marker u_i is associated with a noisy interval $[\theta_i, \theta_{i+1})$ on the utility scale, so relative position and overlap are inferred from choices. A speaker selects a marker when U falls within its interval, $P(u_i \mid pc, g) \propto \sigma(\lambda(U - \theta_i)) \cdot \sigma(-\lambda(U - \theta_{i+1}))$. A pragmatic listener inverts this speaker model to infer pc and g, which in turn inform the listener's adoption of q.

Empirical evidence.[3] We evaluate the account in a three-step pipeline (Fig. 1): a norming study estimates baseline propositional controversy; a production experiment estimates how community-relative controversy and goal strength shape marker choice and fits the speaker model; and a comprehension ex-

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[2]Implemented in Stan; MCMC inference used the No-U-Turn Sampler [11, 12].

[3]Reported coefficients and one-sided probabilities come from Bayesian regression models; hypotheses were evaluated using posterior predictions.

periment tests the corresponding listener-side predictions for inferred goals and adoption. The inferred thresholds are distinct but partially overlapping, with the strongest contrast between *ja* and *bekanntlich*, while *soviel ich weiß* occupies a weaker-threshold region. In production (Fig. 2c), g favours stricter-threshold markers (0.28, $P(> 0) = 1$) and pc_{prag} disfavours them (-0.17, $P(< 0) = 0.98$); the goal effect shrinks under high controversy (interaction: -0.22, $P(< 0) = 0.97$), as predicted by the w_{int} cost term. In comprehension (Fig. 2d), both *ja* (0.49, $P(> 0) = 1$) and *bekanntlich* (0.46, $P(> 0) = 1$) increase inferred g; for adoption, *ja* shows a credible positive effect (0.42, $P(> 0) = 0.99$), and *bekanntlich* shows a weaker one (0.17, $P(> 0) = 0.90$). This dissociation is compatible with *pragmatic reactance* [16]: listeners infer the speaker's goal from marker choice, then discount consensus marking as argumentative pressure when its contextual support is weak. Together, the model links speaker choice and listener interpretation through marker-specific use conditions on a shared latent scale, showing how community-relative consensus and communicative goals jointly shape common-ground management.

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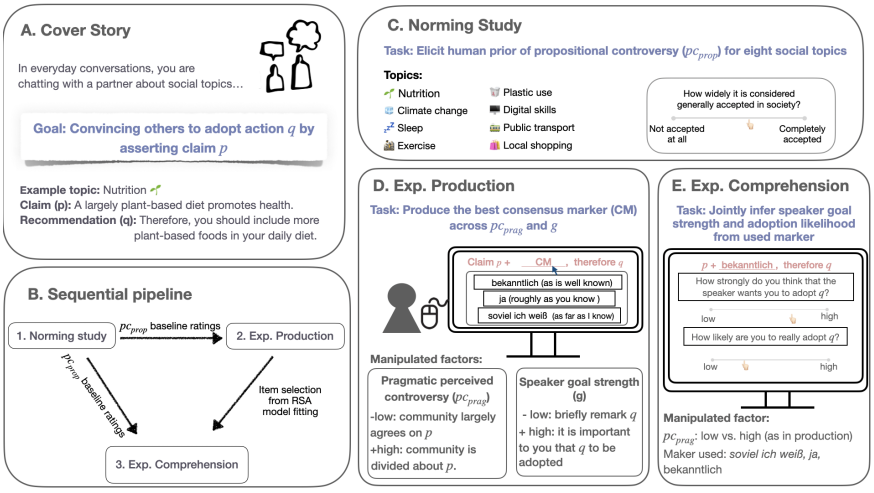
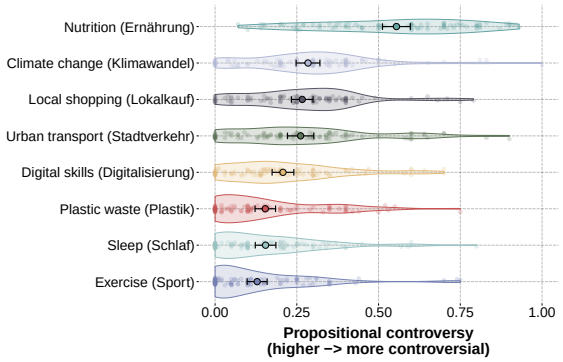
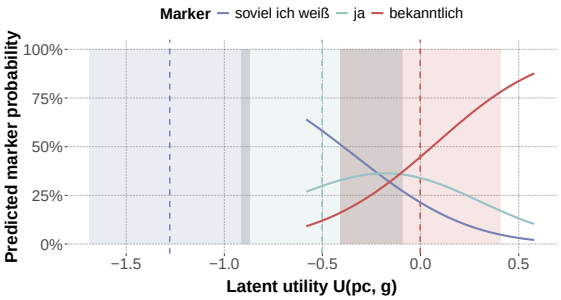


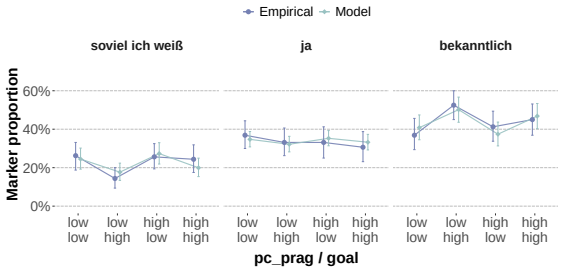
Figure 1: Experimental pipeline. (A) Participants discuss social topics with a partner, with p serving as support for a recommendation q. (B) Sequential design: a norming study establishes baseline propositional controversy, followed by production and comprehension experiments. (C) Norming: eight topics rated for propositional controversy. (D) Production: participants select the best consensus marker given manipulated pragmatic controversy and goal strength. (E) Comprehension: participants infer speaker goal strength and adoption likelihood from marker-containing utterances.



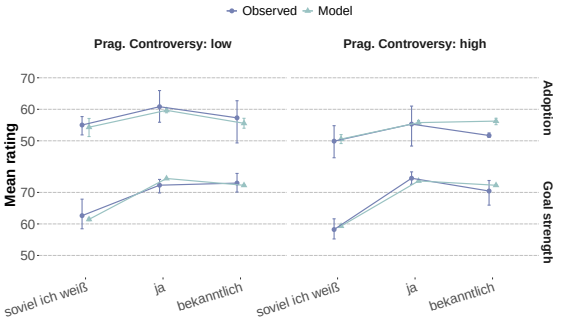
(a) Norming experiment ($N = 102$): topics differ in baseline propositional controversy. German originals in parentheses.



(b) Estimated noisy thresholds along the latent utility axis. Dashed lines: mean thresholds; shaded bands: overlap. The relevant variation falls mainly between *ja* (roughly 'as you know') and *bekanntlich* ('as is well known'), indicating a gradient fitted boundary between the two markers.



(c) Production experiment ($N = 80$): lower controversy and higher speaker goal strength favour stricter-threshold markers.



(d) Comprehension experiment ($N = 80$): stricter-threshold markers increase inferred goal strength, while adoption reveals discounting when contextual support is low.

Figure 2: Model and experimental results. Points show means; error bars show bootstrap 95% confidence intervals.