Online Supplemental Materials:
Embracing Dialectic Intersubjectivity: Coordination of Partisan Perspectives in Content Analysis with LLM Persona Simulation

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Replication code and data are available at
https://github.com/casllmproject/dialectic_intersubjectivity

A. Measurement scales for fine-tuning training data from the 2020-2022 ANES Social Media Study (American National Election Studies, 2023).
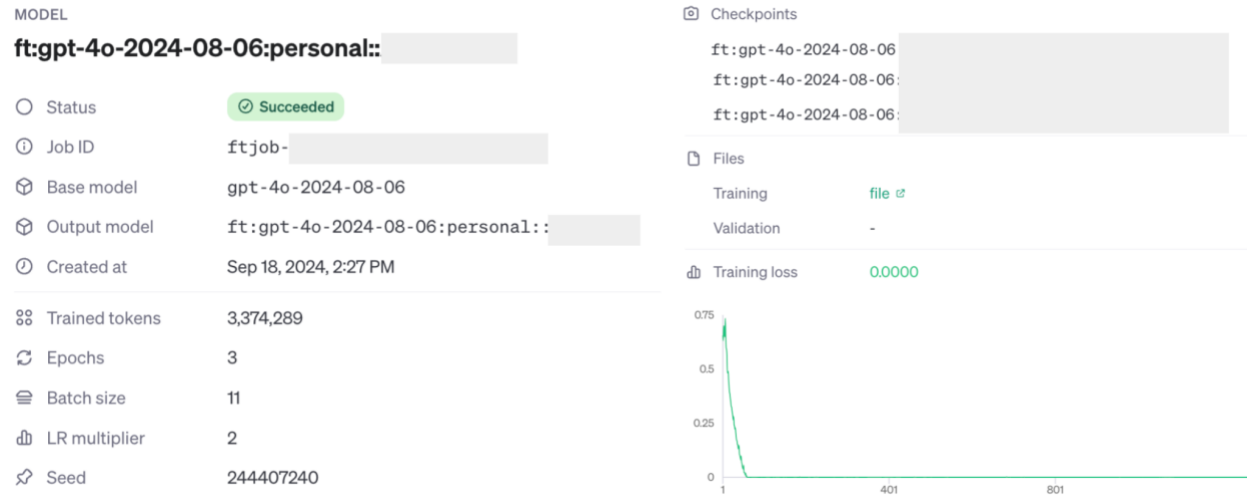
1. **Demographics:**
- **Gender** ("What is your gender?"):
    - 0: Unknown
    - 1: Male
    - 2: Female
- **Age** ("What is your age?"):
    - (numeric input)
- **Race/Ethnicity** ("What is your race/ethnicity?"):
    - 1: White, non-Hispanic
    - 2: Black, non-Hispanic
    - 3: Other, non-Hispanic (includes Asian, non-Hispanic)
    - 4: Hispanic
- **Education Level** ("What is your highest level of education?"):
    - 1: Less than high school
    - 2: High school graduate or equivalent
    - 3: Vocational/tech school/some college/associates
    - 4: Bachelor's degree
    - 5: Postgraduate study/professional degree
- **Income Level** ("What is your income level?"):
    - 1: Less than $5,000
    - 2: $5,000 to $9,999
    - 3: $10,000 to $14,999
    - 4: $15,000 to $19,999
    - 5: $20,000 to $24,999
    - 6: $25,000 to $29,999
    - 7: $30,000 to $34,999
    - 8: $35,000 to $39,999
    - 9: $40,000 to $49,999
    - 10: $50,000 to $59,999
    - 11: $60,000 to $74,999
    - 12: $75,000 to $84,999
    - 13: $85,000 to $99,999
    - 14: $100,000 to $124,999
    - 15: $125,000 to $149,999
    - 16: $150,000 to $174,999
    - 17: $175,000 to $199,999
    - 18: $200,000 or more

2. **Political Ideology:**
- **Self-Identified Political Ideology** ("When it comes to politics, would you describe yourself as liberal, conservative, or neither liberal nor conservative?"):
    - -7: No answer
    - -6: Unit non-response

- ○ -1: Inapplicable (legitimate skip)
- ○ 1: Very liberal
- ○ 2: Somewhat liberal
- ○ 3: Closer to liberal
- ○ 4: Neither liberal nor conservative
- ○ 5: Closer to conservative
- ○ 6: Somewhat conservative
- ○ 7: Very conservative
- ○ 77: Don't know
- ○ 98: Skipped on web
- ○ 99: Refused
- **Party-Specific Political Ideology**
  - ■ "When it comes to politics, would you describe the Democratic Party as liberal, conservative, or neither liberal nor conservative?"
  - ■ "When it comes to politics, would you describe the Republican Party as liberal, conservative, or neither liberal nor conservative?")
    - ○ Same response options as self-identified political ideology

3. **Trust in News Sources:**
- **Trust in Fox News** ("How much do you think political information from Fox News can be trusted?"):
- **Trust in MSNBC** ("How much do you think political information from MSNBC can be trusted?"):
  - ○ -7: No answer
  - ○ -6: Unit non-response
  - ○ -1: Inapplicable (legitimate skip)
  - ○ 1: Not at all
  - ○ 2: A little
  - ○ 3: A moderate amount
  - ○ 4: A lot
  - ○ 5: A great deal
  - ○ 77: Don't know
  - ○ 98: Skipped on web
  - ○ 99: Refused

B. Fine-tuning Processes with ANES 2020-2022

MODEL

ft:gpt-4o-2024-08-06:personal::

○ Status	⊘ Succeeded	
ⓘ Job ID	ftjob-	
⊗ Base model	gpt-4o-2024-08-06	
⊗ Output model	ft:gpt-4o-2024-08-06:personal::	
⊙ Created at	Sep 18, 2024, 2:27 PM	
⊟ Trained tokens	3,374,289	
⟳ Epochs	3	
⊜ Batch size	11	
⊿ LR multiplier	2	
✄ Seed	244407240	

Checkpoints

ft:gpt-4o-2024-08-06
ft:gpt-4o-2024-08-06:
ft:gpt-4o-2024-08-06:

Files

Training   file ☑
Validation   -

Training loss   0.0000

Note. Information on the fine-tuned output model has been obscured to restrict public use.

Figure S1. Screenshot of Fine-Tuning Job Results Display

The training data for fine-tuning the gpt-4o-2024-08-06 base model consisted of the ANES 2020-2022 panel survey (n=5,750). The ten variables used for training included: gender, age, race/ethnicity, education level, income, self-identified political ideology, party-specific political ideology (Democratic and Republican parties), and trust in media (Fox News and MSNBC) (ANES, 2023). On September 18, 2024, the training data were uploaded and validated according to OpenAI's fine-tuning protocol (OpenAI, n.d.). For the fine-tuning, the model was set with three epochs and a batch size of 11. Responses across the ten ANES variables totaled 3,374,289 tokens for the 5,750 respondent samples. The training process took approximately 2 hours and 58 minutes.

C. Sentiment contrast analysis

Table S1. Tukey's HSD analysis for mean difference of sentiment contrast across models

Model		Fox News Sentiment Contrast (Biden - Trump)			MSNBC Sentiment Contrast (Biden - Trump)		
I	J	M*diff*(I-J)	*p*-value	95%CI	M*diff*(I-J)	*p*-value	95%CI
DZ	FD	0.61	< .001	[0.35, 0.88]	0.24	0.07	[-0.01, 0.49]
DZ	DD	0.49	<.001	[0.23, 0.76]	-0.09	0.90	[-0.34, 0.16]
DZ	FZ	-0.11	0.86	[-0.37, 0.16]	-0.03	0.999	[-0.28, 0.22]
DZ	FR	-1.03	<.001	[-1.29, -0.76]	-1.11	<. 001	[-1.36, -0.86]
DZ	DR	-1.04	<.001	[-1.31, -0.78]	-0.76	< .001	[-1.01, -0.51]
FD	DD	0.12	0.79	[-0.38, 0.14]	-0.33	<. 01	[-0.58, -0.08]
FD	FZ	-0.72	<.001	[-0.98, -0.46]	-0.27	< .05	[-0.52, -0.02]
FD	FR	-1.64	<.001	[-1.90, -1.37]	-1.35	< .001	[-1.60, -1.10]
FD	DR	-1.66	<.001	[-1.92, -1.39]	-1.00	< .001	[-1.25, -0.75]
DD	FZ	-0.60	<.001	[-0.86, -0.34]	0.06	0.982	[-0.19, 0.31]
DD	FR	-1.52	<.001	[-1.78, -1.26]	-1.01	< .001	[-1.27, -0.76]
DD	DR	-1.54	<.001	[-1.80, -1.27]	-0.67	< .001	[-0.92, -0.42]
FZ	FR	-0.92	<.001	[-1.18, -0.66]	-1.08	< .001	[-1.33, -0.83]
FZ	DR	-0.94	<.001	[-1.20, -0.67]	-0.73	< .001	[-0.98, -0.48]
FR	DR	-0.02	1.000	[-0.28, 0.25]	0.35	< .01	[0.10, 0.60]

Post-hoc Tukey's HSD analyses show that persona prompting significantly intensifies partisan bias for both outlets. However, this increase in bias does not vary significantly between default and fine-tuned models. Notably, the Fox News analysis showed no significant difference in sentiment contrast between the default and fine-tuned models. Similarly, for MSNBC, the default model's sentiment contrast did not differ significantly from the fine-tuned zero-shot model or from either the default or fine-tuned Democrat persona models. In other words, the overall polarity of sentiment analysis for Biden and Trump remains consistent across these Default-to-Democrat model variations.

D. Wasserstein Distance Equation

The mathematical formulation for the Wasserstein distance (also known as the Earth Mover's Distance for one-dimensional distributions) is:

$$W(p, q) = \int_{-\infty}^{\infty} |F_p(x) - F_q(x)| dx$$

where:

- $W(p, q)$ is the Wasserstein distance between the two distributions $p(x)$ and $q(x)$.
- $p(x)$ and $q(x)$ represent the distribution of sentiment contrast between Biden and Trump, as generated by the Democrat or Republican persona models, respectively.
- $F_p(x)$ and $F_q(x)$ are the cumulative distribution functions (CDFs) of the two distributions.
- The integral computes the area between these two CDFs.