Source Memory Is More Accurate for Opinions Than for Facts

WEB APPENDIX

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Supplementary Experiments: S1-S3

In experiment S1 (N = 499; 170 excluded for inattentiveness as defined by low recognition memory scores), we deviated from the design used in experiments 1-6 by (i) using a larger stimulus set, presenting *each* participant with 12 sources for a total of 48 claims per person; (ii) presenting claims not as individually distinct statements but as single paragraph-style film reviews from Metacritic, where each review consisted of two factual statements and two opinions; and (iii) choosing longer, more nuanced claims for both factual statements (e.g., "*The Postman's White Nights* is shot in an isolated village in Northern Russia on and around Kenozero Lake, with a cast made up primarily of untrained locals playing versions of themselves") and opinions (e.g., "The setting itself is gorgeous, with its boxy cottages fringed by grassy clearings and woodlands, and the placid surface of the water stretching on for miles").

In experiment S1, source memory for factual statements (21.1%) and for opinions (20.4%) did not substantively differ based on claim type (b = -.67, t(321) = -.96, p = .337). We suspect this result may be attributable to the increased cognitive load associated with a considerably larger and more complex stimulus set. Participants in experiment S1 were much more likely than in other experiments to have misattributed claims to sources not previously seen in this experiment (filler sources). Whereas in the nine experiments in the main text, the average rate of misattribution of claims to filler sources ranged from 20.0% to 26.4%, in experiment S1 the average rate of misattribution of claims to filler sources was a substantial outlier at 35.5%. Notably, 170 inattentive participants (34%) were excluded from analyses of experiment S1 for scoring at or below chance on the recognition memory task.

Experiment S2 (N = 501; 92 excluded for inattentiveness as defined by low recognition

memory scores) followed the same design and used the same stimulus set as experiment 2b (with Goodreads book review claims) but tested cued recall rather than full claim recall during the recall stage. In the source memory stage of experiment S2, participants were sequentially shown only the book titles present in previously seen claims and asked to identify the sources associated with the reviews about those books based solely on the book titles (e.g., "Who do you know who has read *The Walmart Book of the Dead*?").

In experiment S2, participants accurately identified the source for 31.8% of opinions and for 31.8% of facts, a difference that is clearly not statistically significant (b = .03, $t(401)$ = .03, p = .978). The results of experiment S2 suggest that, in the absence of any information about the substantive content of a previously seen claim, cued recall may be insufficient to accurately identify the claim's source. This may present a boundary condition for the main effect of claim objectivity on source memory, as successful source attribution can depend on how much information is provided during a recall task (Dodson and Johnson 1993).

Experiment S3 (N = 601; 42 excluded for inattentiveness as defined by low recognition memory scores) extended the investigation of source effects by using media outlets as sources rather than people. Using a stimulus set of 20 unique artificial media sources and 80 claims in the form of news headlines, each participant was sequentially presented with five sources accompanied by two factual statements (e.g., "Biden Asks Congress to End Federal Moratorium on Evictions") and two opinions (e.g., "It Is Not Biden's Place to End Moratorium on Evictions"). As an engagement task during the encoding stage, participants were asked to indicate how interested they would be in visiting the media source's website on a scale from (1) Not at all interested to (5) Very interested. When tested on source memory, participants on average accurately identified the sources for 26.8% of opinions and for 27.7% of facts, a

difference that is not statistically significant (b = -.89, $t(551)$ = -.85, p = .393).

Whereas opinion claims provide information about the attitudes and beliefs of their sources, it is possible that opinion news headlines may be perceived as less indicative of the views of a periodical publication (rather than those of a specific author), and the claim may subsequently lose some of its informational potency. Similarly, a source may provide useful information about a claim, but the use of artificially generated periodical publications may not allow for a stronger association to form between sources and claims as might be expected for familiar sources. As the extent to which a claim provides information about its source (or a source provides information about the claim) is key for stronger source-claim associative links to form during encoding, it is possible that the use of artificially generated media sources (rather than e.g., individual journalists or familiar media sources) limited our ability to detect a main effect.

Supplementary Analyses: Including Inattentive Participants

The primary analyses presented in the main text excluded participants identified as inattentive (based on their performance at or below chance on the recognition memory task). Below, we repeat the primary test without excluding inattentive participants.

In experiment 1, on average, participants accurately identified the source for 41.8% of opinions and for 31.4% of factual statements ($b = 10.35$, $t(397) = 9.82$, $p < .001$). This result is in-line with the result presented in the main text.

In experiment 2a, on average, participants accurately identified the source for 38.9% of opinions and for 36.8% of factual statements ($b = 2.12$, $t(493) = 2.05$, $p = .041$). This result is in-line with the result presented in the main text.

In experiment 2b, on average, participants accurately identified the source for 34.5% of opinions and for 31.4% of factual statements ($b = 3.13$, $t(496) = 3.06$, $p = .002$). This result is in-line with the result presented in the main text.

In experiment 2c, on average, participants accurately identified the source for 45.6% of opinions and for 42.0% of factual statements ($b = 3.58$, $t(495) = 3.28$, $p = .001$). This result is in-line with the result presented in the main text.

In experiment 2d, on average, participants accurately identified the source for 35.8% of opinions and for 32.3% of factual statements ($b = 3.47$, $t(493) = 3.43$, $p < .001$). This result is in-line with the result presented in the main text.

In experiment 3, on average, participants accurately identified the source for 36.7% of opinions and for 31.7% of factual statements for claims originating from layperson sources ($b = 4.98$, $t(590) = 3.57$, $p < .001$). Participants accurately identified the source for 35.5% of opinions

and for 32.0% of factual statements for claims originating from expert sources (b = 3.44, t(590) = 2.51, p = .012). These results are in-line with the result presented in the main text.

In experiment 4, on average, participants accurately identified the source for 35.0% of opinions, for 36.2% of facts about the source, and for 33.0% of facts about the world. Source memory was more accurate for facts about the source than for facts about the world (b = 3.18, t(401) = 3.43, p < .001). Source memory was also more accurate for opinions than for facts about the world (b = 2.01, t(401) = 2.12, p = .035). Source memory for facts about the source was not significantly different from source memory for opinions (b = 1.17, t(401) = 1.33, p = .186). These results are in-line with the result presented in the main text.

In experiment 5, on average, participants accurately identified the source for 34.8% of opinions and for 31.9% of factual statements when sources were authors of claims (b = 2.95, t(1197) = 3.31, p < .001). Participants accurately identified the source for 26.2% of opinions and for 25.6% of factual statements when sources were re-tellers of claims (b = .64, t(1197) = .71, p = .480). The interaction effect of claim authorship, represented by the coefficient on the contrast code reflecting the between-subject manipulation of claim authorship (authors vs. re-tellers), indicated a marginally significant reduction in the main effect. The magnitude of the difference in source memory accuracy between opinions and facts was reduced for re-tellers compared with authors (b = -2.31, t(1197) = -1.83, p = .068). These results are each in-line with the result presented in the main text.

In experiment 6a, on average, participants made claim-based inferences about sources who shared opinions at a rate of 38.6% and about sources who shared factual statements at a rate of 34.8% (b = 3.83, t(632) = 3.97, p < .001). This result is in-line with the result presented in the main text.

In experiment 6b, on average, participants intended to seek advice from topically relevant sources for 39.1% of sources who shared opinions and for 36.6% of sources who shared factual statements (b = 2.50, t(631) = 2.46, p = .014). This result is in-line with the result presented in the main text.

In experiment S1, on average, participants accurately identified the source for 17.3% of opinions and for 18.5% of factual statements (b = -1.25, t(491) = -2.29, p = .023). This result is different from the result presented earlier in the Web Appendix.

In experiment S2, on average, participants accurately identified the source for 28.8% of opinions and for 28.6% of factual statements (b = .23, t(493) = .24, p = .812). This result is in-line with the result presented earlier in the Web Appendix.

In experiment S3, on average, participants accurately identified the source for 25.8% of opinions and for 27.0% of factual statements (b = -1.15, t(593) = -1.16, p = .247). This result is in-line with the result presented earlier in the Web Appendix.

Supplementary Analyses: Claim Recognition Memory

The effect of claim objectivity on recognition memory for Experiments 1, 2a, 2b, 2c, and 2d was reported in the main text.

In experiment 3's recognition memory test, participants correctly classified 84.8% of opinions and 83.5% of factual statements (b = 1.27, t(560) = 2.26, p = .024). As in all calculations of recognition memory, these accuracy rates include identification of filler claims as not having been presented previously. However, to calculate recognition memory by source expertise in experiment 3, we include only a participant's accurate recognition of claims previously shared by expert sources or by layperson sources, and necessarily exclude recognition memory for filler claims. On average, participants correctly recognized 80.8% of opinions from layperson sources and 77.6% of factual statements from layperson sources. We find greater recognition memory for opinions than for factual statements when claims originate from layperson sources (b = 3.19, t(560) = 2.47, p = .014). However, when claims originated from expert sources, participants on average correctly recognized 81.8% of opinions and 80.1% of factual statements. There was no statistically significant effect of claim objectivity on recognition memory for claims originating from expert sources (b = 1.78, t(560) = 1.45, p = .149).

In experiment 4, on average, participants accurately classified 80.6% of opinions, 79.0% of facts about the world, and 75.2% of facts about the source. Recognition memory was more accurate for opinions than for facts about the world (b = 1.57, t(305) = 2.27, p = .024). However, recognition memory was more accurate for facts about the world than for facts about the source (b = 3.83, t(305) = 5.34, p < .001).

In experiment 5, on average, participants accurately classified 78.5% of opinions after

encountering authors, 77.3% of opinions after encountering re-tellers, 78.2% of factual statements after encountering authors, and 78.2% of factual statements after encountering re-tellers. We find that claim objectivity does not affect recognition memory when aggregated across authorship conditions (b = -.25, t(1076) = -.54, p = .592). We find no interaction effect of claim authorship on a difference in recognition memory between opinions and facts (b = .59, t(1076) = 1.26, p = .208). There was no simple effect of claim objectivity on recognition memory when sources were authors (b = .34, t(1076) = .51, p = .608) nor when sources were re-tellers (b = -.84, t(1076) = -1.27, p = .206). Average claim recognition memory collapsed across both facts and opinions was no different between authorship conditions (b = .301, t(1076) = .745, p = .456).

In experiment 6a, on average, participants correctly classified 87.3% of opinions and 85.6% of factual statements (b = 1.69, t(590) = 3.08, p = .002). Exploratory analyses help to distinguish recognition memory for previously seen claims from recognition memory for filler claims. Exploratory analyses reveal a significant effect of claim objectivity on recognition memory for filler claims such that recognition memory is more accurate for filler opinions than for filler facts (b = 3.34, t(590) = 5.60, p < .001). But recognition memory is no more accurate for previously seen opinions than for previously seen facts (b = 0.04, t(590) = 0.05, p = .961).

In experiment 6b, on average, participants correctly classified 87.9% of opinions statements and 85.8% of factual statements (b = 2.13, t(589) = 4.04, p < .001). Exploratory analyses again reveal a significant effect of claim objectivity on recognition memory for filler claims such that recognition memory is more accurate for filler opinions than for filler facts (b = 4.39, t(589) = 7.17, p < .001). Again, recognition memory is no more accurate for previously seen opinions than for previously seen facts (b = -0.12, t(589) = -0.14, p = .887).

The results of exploratory analyses for experiments 6a and 6b suggest that, rather than

claim objectivity differentially affecting memory for claims shown to participants during the encoding stage, the effect of claim objectivity on recognition memory seem to be driven by participants' reduced ability to identify filler facts (compared to filler opinions) as novel.

In experiment S1, on average, participants correctly recognized 68.1% of opinions statements and 70.8% of factual statements (b = -2.71, t(321) = -4.12, p < .001).

In experiment S2, on average, participants correctly recognized 69.8% of opinions statements and 70.3% of factual statements (b = -0.53, t(401) = -0.66, p = .510).

In experiment S3, on average, participants correctly recognized 85.7% of opinions statements and 84.5% of factual statements (b = 1.22, t(551) = 1.90, p = .057).

Supplementary Analyses: Experiment 3 Main Effect by Source Type

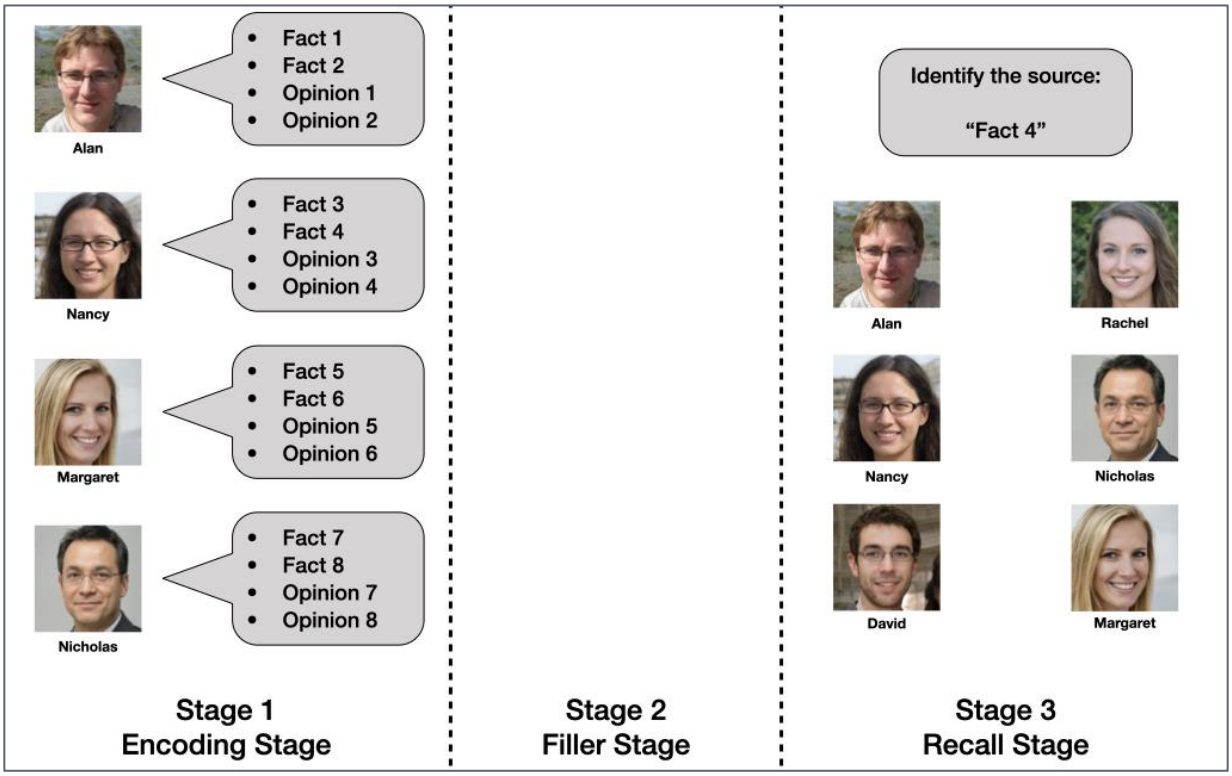
In experiment 3, in addition to the main analysis of source memory, we also examined how accurately participants were able to correctly identify the *expertise* of a claim's source, regardless of whether or not they could correctly identify the specific source (e.g., in some cases participants were able to correctly identify that a given claim originated from a medical professional, even though they could not correctly identify the particular medical professional source). This broader definition of accuracy allowed for analyses of memory of the source's expertise. When claims originated from layperson sources, participants correctly identified the sources' expertise for 69.8% of opinions and for 66.1% of facts. This difference is statistically significant (b = 3.67, $t(560)$ = 2.60, p = .010). However, when claims originated from expert sources, participants correctly identified the sources' expertise for 74.6% of opinions and for 75.6% of facts. This difference is not statistically significant (b = -.94, $t(560)$ = -0.68, p = .499).

The difference between these two differences is statistically significant, with a greater effect of claim objectivity on memory for sources' expertise for claims originating from layperson sources than for claims originating from expert sources (b = 4.61, $t(560)$ = 2.30, p = .022). Whereas participants were more likely to misattribute facts originating from layperson sources to medical expert sources than they were to misattribute opinions originating from layperson sources to medical expert sources, there was no difference in their tendency to misattribute facts vs opinions originating from medical expert sources to layperson sources. Considered differently, across all sources, facts were more likely to be attributed to experts than were opinions.

This finding is aligned with research on source memory failures, such that even when memory for the specific source is not accessible, certain associations may persist (Hutchinson and Moore 1984; Kumkale and Albarracín 2004). Moreover, during source memory failures, consumers can form educated guesses based on the content of the claims and heuristics about the most probable source for such a claim (Batchelder and Batchelder 2008; Bell et al. 2020; Bell et al. 2021), possibly inferring facts are more likely to come from experts than are opinions.

Experimental Design and Examples

Flow Diagram of 3-Stage Experimental Design



Experimental Design – Stage 1 Example

Experimental Design – Stage 3 Example