

Supplemental Analyses

The Interactive Effects of Ambivalence and Certainty on Political Opinion Stability

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Re-Analysis of Prior Data

The data analyzed in the present manuscript utilized two self-report measures of ambivalence, which we suggest correspond to different conceptual aspects of ambivalence. As we note, however, the original research that pointed to a difference between objective (“mixed”) and subjective (“felt conflict”) ambivalence in the context of certainty’s effect on attitude stability included measures similar to those used in the present data.

In Studies 1 and 2 of Luttrell, Petty, & Briñol (2016), the “subjective ambivalence” measure included the following items: “To what extent do you feel mixed about organic food?” (1 = I am completely one-sided; 7 = I have completely mixed reactions) and “To what extent do you feel conflicted about organic food?” (1 = Feel no conflict at all; 7 = Feel maximum conflict). The first item is similar to the item in the present study that we use as an indicator of structural ambivalence (“I sometimes have mixed feelings and beliefs about the abortion issue.”) and the second item is similar to the item in the present study that we use as an indicator of felt conflict (“I sometimes find myself feeling ‘torn’ between two sides of the abortion issue.”).

Here we re-analyze the data from Luttrell et al. (2016), provided on the Open Science Framework (OSF), to examine whether the ambivalence \times certainty interaction holds when using just the “mixed” item as the measure of ambivalence, as we show in the associated manuscript. We also test whether the “conflicted” item interacts with certainty, but we anticipated that it would not, consistent with the results in the associated manuscript. Full analysis scripts can be found on the OSF page for this project (<https://osf.io/e7zb2/>).

Table S1 reports the results of a series of multiple regression models for Studies 1 and 2 in Luttrell et al. (2016). Each model enters mean-centered attitude extremity, certainty, a measure of ambivalence, and the certainty \times ambivalence interaction term as predictors of absolute attitude change over time. The measure of ambivalence, however, varies across models. Models using “objective ambivalence” reproduce the results reported by Luttrell et al. (2016). We show that models using the “mixed” item from the “subjective ambivalence” battery also show evidence of an interaction with certainty (see Figures S1 and S2). Models using the “conflicted” item, however, do not show evidence of an interaction with certainty.

Together, these new analyses of existing data are consistent with the results reported for the Florida Voters Panel Study: self-reports of being “mixed” about an issue interact with certainty to predict stability over time whereas self-reports of feeling “conflicted” do not.

Table S1. Re-Analysis of Luttrell, Petty, and Briñol (2016; Studies 1 and 2)

	Study 1			Study 2		
	Objective Ambivalence	Mixed	Conflicted	Objective Ambivalence	Mixed	Conflicted
Extremity	-.15**	-.13*	-.17**	.34**	.28**	.27**
[Ambivalence]	-.03	.01	-.05 ⁺	.03	.02	.02
Certainty	.04	.05	.05	.02	.00	.00
[Ambivalence] × Certainty	.04*	.04*	.01	.07**	.06*	.03

Note. Values reported are unstandardized regression coefficients. ⁺ $p < .10$, * $p < .05$, ** $p < .01$.

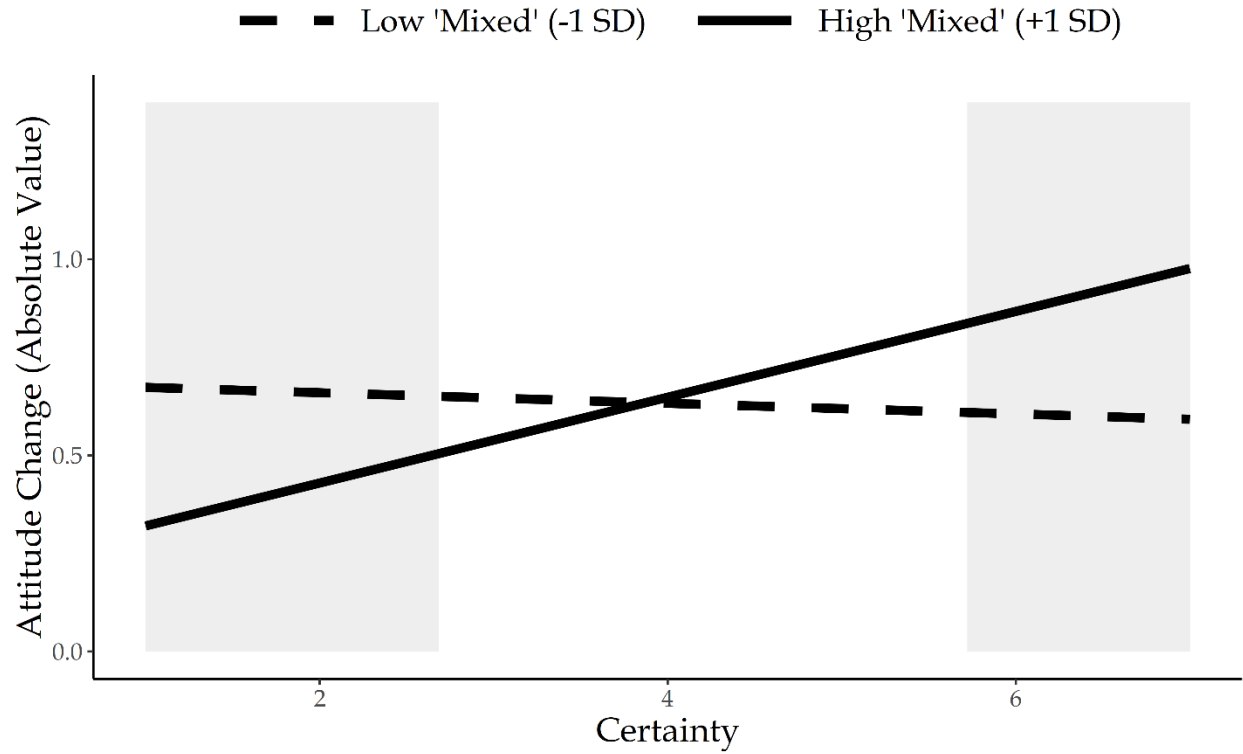


Figure S1. Certainty \times Mixed (Study 1). Two-way interaction between attitude certainty and subjective reports of being “mixed” on change over time in attitudes toward organic food (Luttrell et al., 2016, Study 1). Gray areas indicate areas beyond 1 SD above and below the mean of certainty.

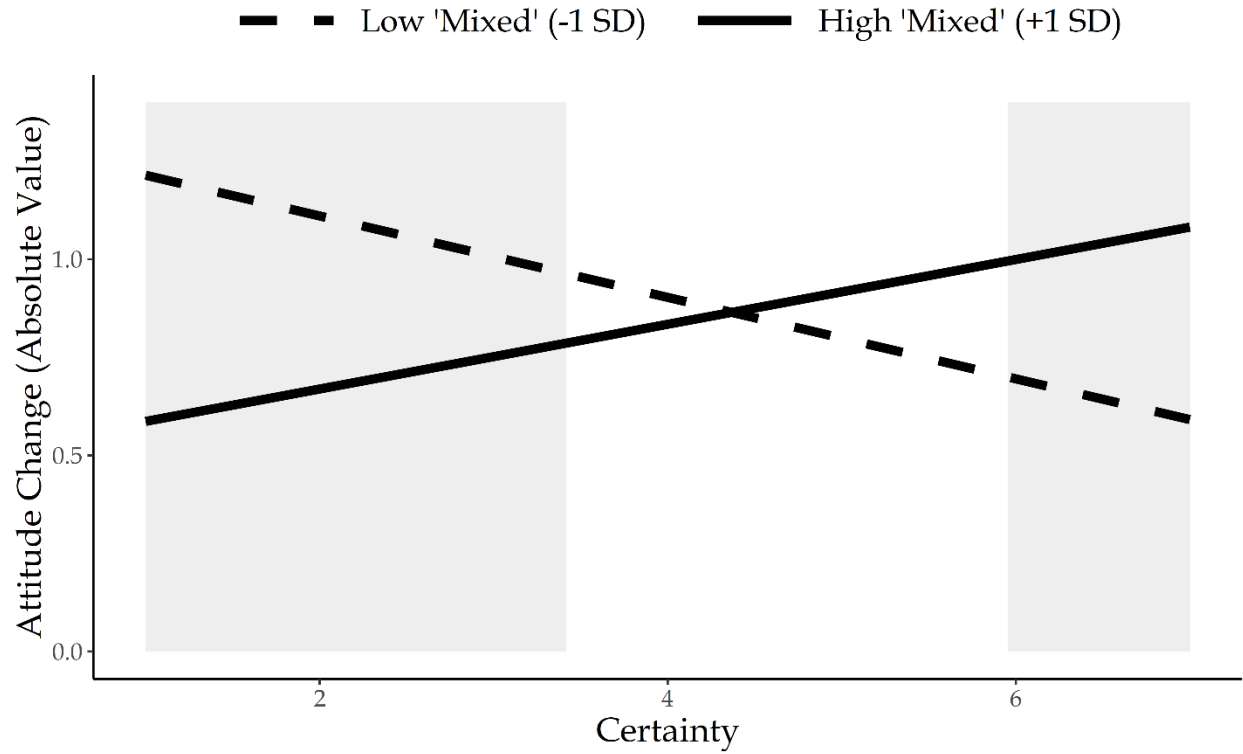


Figure S2. Certainty \times Mixed (Study 2). Two-way interaction between attitude certainty and subjective reports of being “mixed” on change over time in attitudes toward alcohol (Luttrell et al., 2016, Study 2). Gray areas indicate areas beyond 1 SD above and below the mean of certainty.

Models without Interaction Terms

To test the direct effects of the measures of certainty and ambivalence, we conducted the four main regression models without including interaction terms as predictors. Table S2 presents results for the main data set in our manuscript (corresponding to Table 3 in the text). Table S3 presents results for the re-analyses presented in this supplement (corresponding to Table S1).

Table S2. Logistic Regression Model Results without Interaction Terms (Abortion Attitudes)

	<u>Ambivalence = “Mixed”</u>		<u>Ambivalence = “Torn”</u>	
	Opinion Change	Opinion Change (Pro-Anti)	Opinion Change	Opinion Change (Pro-Anti)
Age	.01	.03*	.01	.03*
Gender	.28	.36	.26	.30
Education	-.11*	-.09	-.13*	-.09
Political Ideology	.02	-.03	.07	.01
Ambivalence	.28**	.14	.24**	.17*
Certainty	-.04	-.06	-.04	-.08

Note. Values are unstandardized regression coefficients. * $p < .05$, ** $p < .10$

Table S3. Linear Regression Model Results without Interaction Terms (Re-Analyses)

	Study 1			Study 2		
	Objective Ambivalence	Mixed	Conflicted	Objective Ambivalence	Mixed	Conflicted
Extremity	-.17**	-.14**	-.17**	.31**	.25**	.25**
[Ambivalence]	-.03	.00	-.06 ⁺	.06	.00	.00
Certainty	.03	.04	.04	.00	-.01	-.01

Note. Values reported are unstandardized regression coefficients. ⁺ $p < .10$, * $p < .05$, ** $p < .01$.

Models without Demographic Covariates

As noted in the text, our results hold when age, gender, education, and political ideology are omitted from the models.

Table S4. Logistic Regression Model Results without Covariates

	<u>Ambivalence = “Mixed”</u>		<u>Ambivalence = “Torn”</u>	
	Opinion Change	Opinion Change (Pro-Anti)	Opinion Change	Opinion Change (Pro-Anti)
Ambivalence	.26**	.16	.21**	.16*
Certainty	-.13	-.18	-.10	-.18
Ambivalence × Certainty	.15**	.16*	.04	.08
<i>Sample Size</i>	382	320	373	314

Note. Values are unstandardized regression coefficients. * $p < .05$, ** $p < .10$

Addressing Relative Infrequency of Change

The attitude stability measure we report in the text is the results of a scoring procedure that considers *any* change of response to the abortion question as an unstable response. Thus, a participant who shifted from “Neither” to “Don’t Know” is counted the same as a participant who shifted from “Pro-Life” to “Pro-Choice.” To test whether certainty and reports of being mixed similarly interact to predict the most extreme cases of change, shifting from “Pro-Life” to “Pro-Choice” or vice versa, the sample was reduced to just the respondents who indicated a clear “Pro-Life” or “Pro-Choice” position at Time 1 as well as at Time 2 ($N = 345$). Not surprisingly, the majority of this subsample (88.1%) indicated the same position during both surveys; only 11.9% shifted from one position to the other.

The previously reported multiple logistic regression model was run again on this reduced sample. The ambivalence \times certainty interaction was again significant, $B = .16$, $Z = 2.05$, $p = .04$, 95% CI: [.01, .32]. As with the full sample, certainty was negatively associated with change likelihood at relatively low ambivalence (1 SD below the mean), $B = -.42$, $Z = -2.00$, $p = .045$, 95% CI: [-.83, .01], but not at relatively high ambivalence (1 SD above the mean), $B = .11$, $Z = .69$, $p = .49$, 95% CI: [-.20, .45]. Similarly, ambivalence was positively associated with change likelihood at relatively high certainty (i.e., the maximum value of certainty), $B = .32$, $Z = 2.21$, $p = .03$, 95% CI: [.04, .61], but not at relatively low certainty (1 SD below the mean), $B = -.07$, $Z = -.46$, $p = .65$, 95% CI: [-.37, .23].

Just like the models reported in the text, we also submitted these data to another set of models replacing the “mixed” predictor with feeling torn. Demographic covariates, certainty, feeling torn, and the certainty \times torn interaction term were entered as simultaneous predictors of attitude change (Table S5). Unlike with being “mixed,” there was no interaction between feeling torn and certainty, $B = .07$, $Z = 1.44$, $p = .15$, 95% CI: [-.03, .17]. As another approach, we tested the certainty \times mixed interaction while controlling for felt conflict. Just as with the model reported in the text, these results also show that the certainty \times mixed interaction remain significant, $B = .18$, $Z = 2.25$, $p = .03$, 95% CI: [.02, .34].

The relative infrequency of change in the above analysis may prompt concerns regarding potential bias in estimating logistic regression parameters (e.g., King & Zeng, 2001). Therefore, we also analyzed these data using the ReLogit model (first developed by King & Zeng, 2001) in the *zelig* package for R (Choirat, Honaker, Imai, King, & Lau, 2017). ReLogit conducts logistic regression analyses, correcting estimates for biases that occur in small samples or when observed events are rare. Applying these corrections had a negligible effect on the certainty \times mixedness interaction ($B = .15$, $Z = 1.96$, $p = .05$). These corrections also had a negligible effect on the certainty \times torn interaction when strict change was the outcome of interest ($B = .07$, $Z = 1.40$, $p = .16$).

Table S5. Logistic Regression Model Results

	<u>Ambivalence</u> = "Mixed"	<u>Ambivalence</u> = "Torn"
Age	.03*	.03*
Gender	.39	.29
Education	-.08	-.08
Political Ideology	-.04	.02
Ambivalence	.15	.18*
Certainty	-.15	-.14
Ambivalence \times Certainty	.16*	.07
<i>Sample Size</i>	310	304

Note. Values are unstandardized regression coefficients. Ambivalence and certainty are mean-centered.

References

- Choirat, C., Honaker, J., Imai, K., King, G., & Lau, O. (2017). Zelig: Everyone's Statistical Software. Version 5.1.4.90000. Retrieved from URL: <http://zeligproject.org>.
- King, G., & Zeng, L. (2001). Logistic regression in rare events data. *Political Analysis*, 9, 137-163.
- Luttrell, A., Petty, R. E., & Briñol, P. (2016). Ambivalence and certainty can interact to predict attitude stability over time. *Journal of Experimental Social Psychology*, 63, 56-68.