ssrs redefining research

Can One Weight Fit All?

Adjusting Hybrid Samples For Subgroup Estimation

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Acknowledgements

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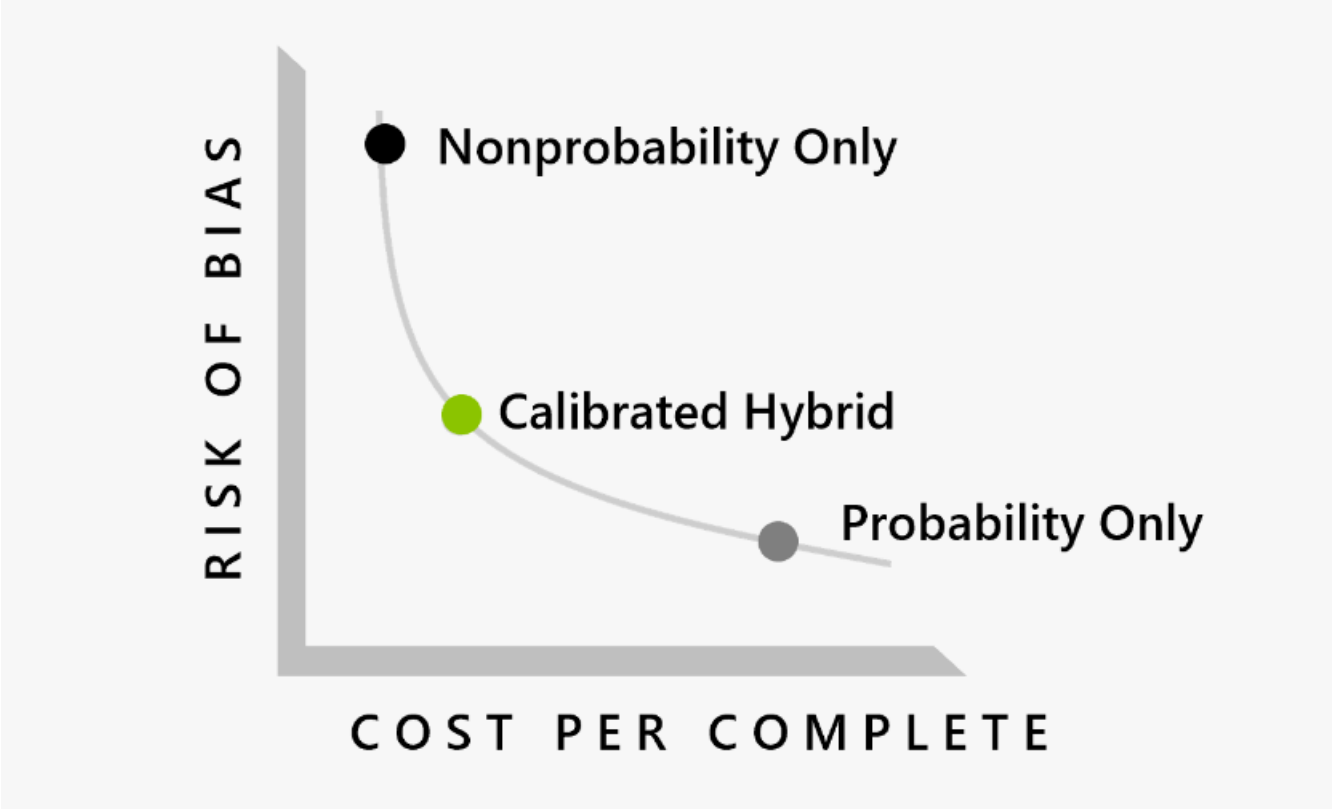
All views expressed in this presentation are those of the presenter and not of AAU.

Why Hybrids?


RISK OF BIAS
Nonprobability Only
Calibrated Hybrid
Probability Only
COST PER COMPLETE

The SSRS Encipher Hybrid Methodology

Encipher is the new SSRS methodology for calibrating hybrid samples that blend probability and nonprobability data (https://ssrs.com/encipher).

- **Broad Approach:**
  - Weight probability sample to external (demographic) benchmarks
  - Estimate probability-based "internal" (non-demographic) benchmarks
  - Reweight full hybrid sample to external + internal benchmarks

- **Unique Elements of Encipher:**
  - Experimentally validated calibration item bank
  - Automated procedure for optimizing calibration model to minimize estimated bias across key outcomes

Today's Research Question

- Often, we are interested not just in overall estimates, but estimates within subgroups
- Prior evidence suggests that patterns of selection bias can be different for subgroups than overall (Pew Research Center, 2016)
- Implication: A calibration model that is optimized for reducing bias in topline estimates may not be sufficient for subgroup estimates
- Kern et al. (2022) propose one solution ("universal adaptability") in the context of prediction estimators—but in practice, such estimators are not convenient for most clients

Today's Research Question

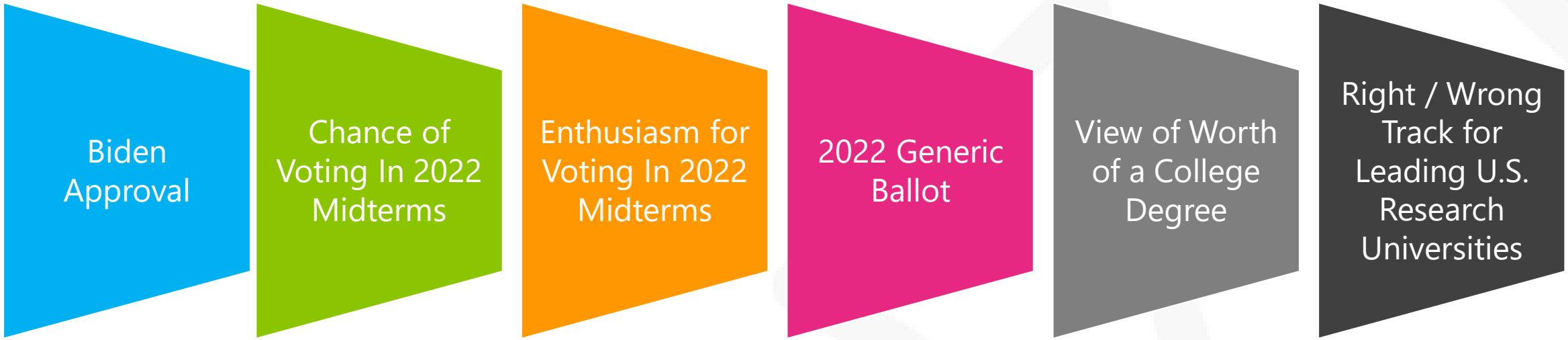
Can the SSRS Encipher Hybrid calibration procedure be modified to:

- Simultaneously **control selection bias across multiple, overlapping subgroups** in a hybrid sample;
- While still producing a **single set of weights** that can be used to analyze all outcomes?

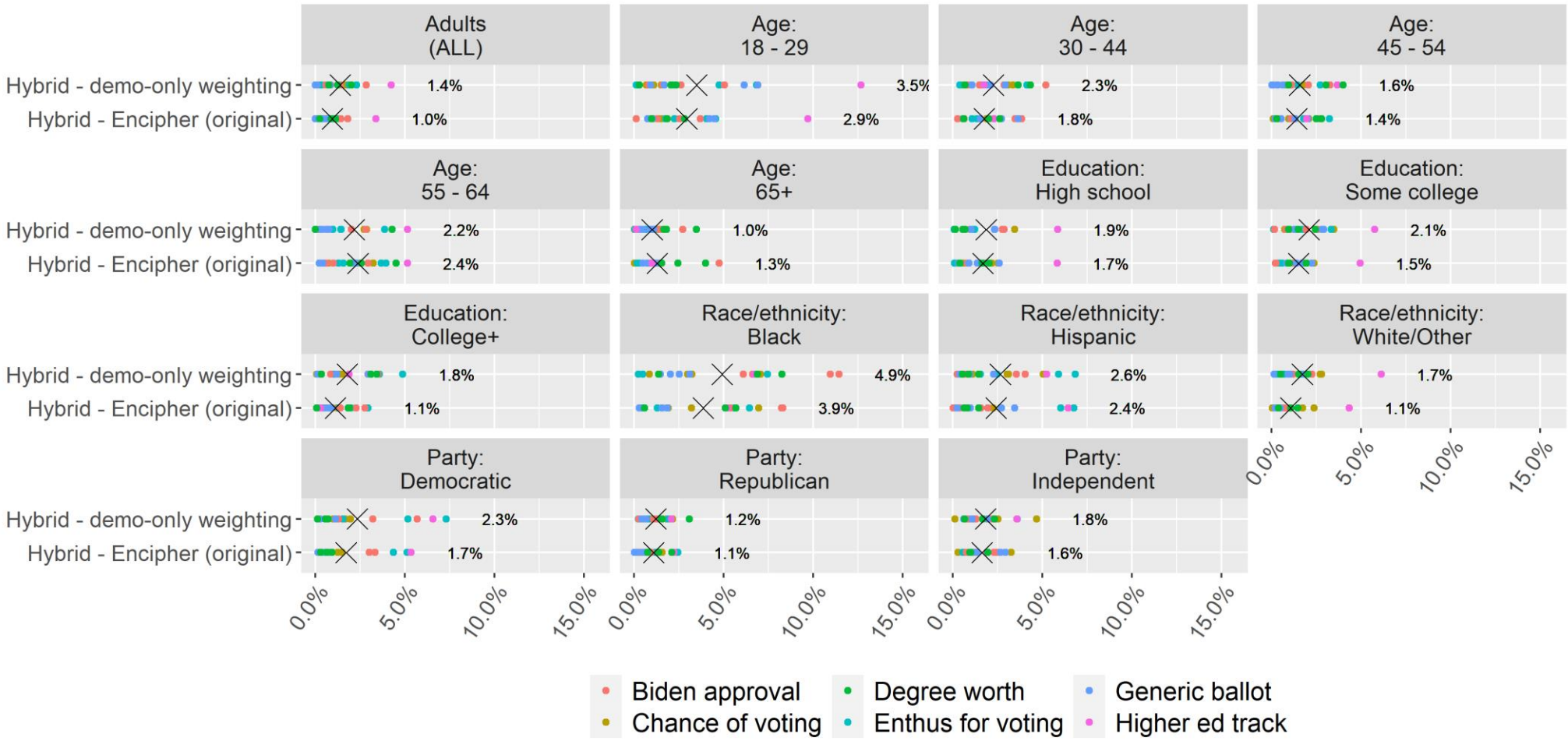
Case Study: AAU April National Study

- Sponsored by Association of American Universities (AAU)
- Same questionnaire ran near-concurrently on: (1) A nonprobability online sample (2) The probability-based SSRS Opinion Panel Omnibus
- Calibrated using Encipher Hybrid

Key Outcomes



Average Selection Bias in Hybrid Estimates, by Subgroup



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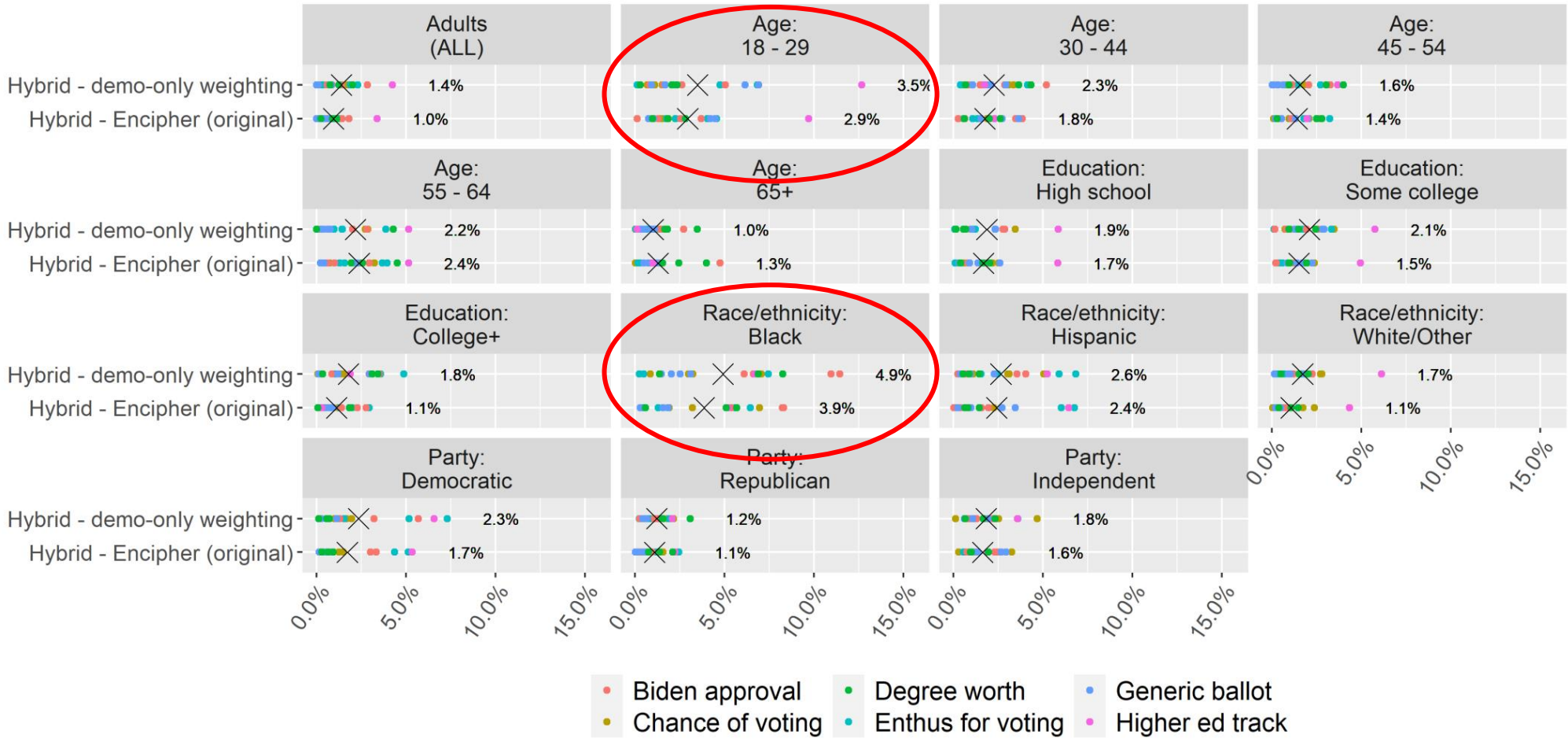
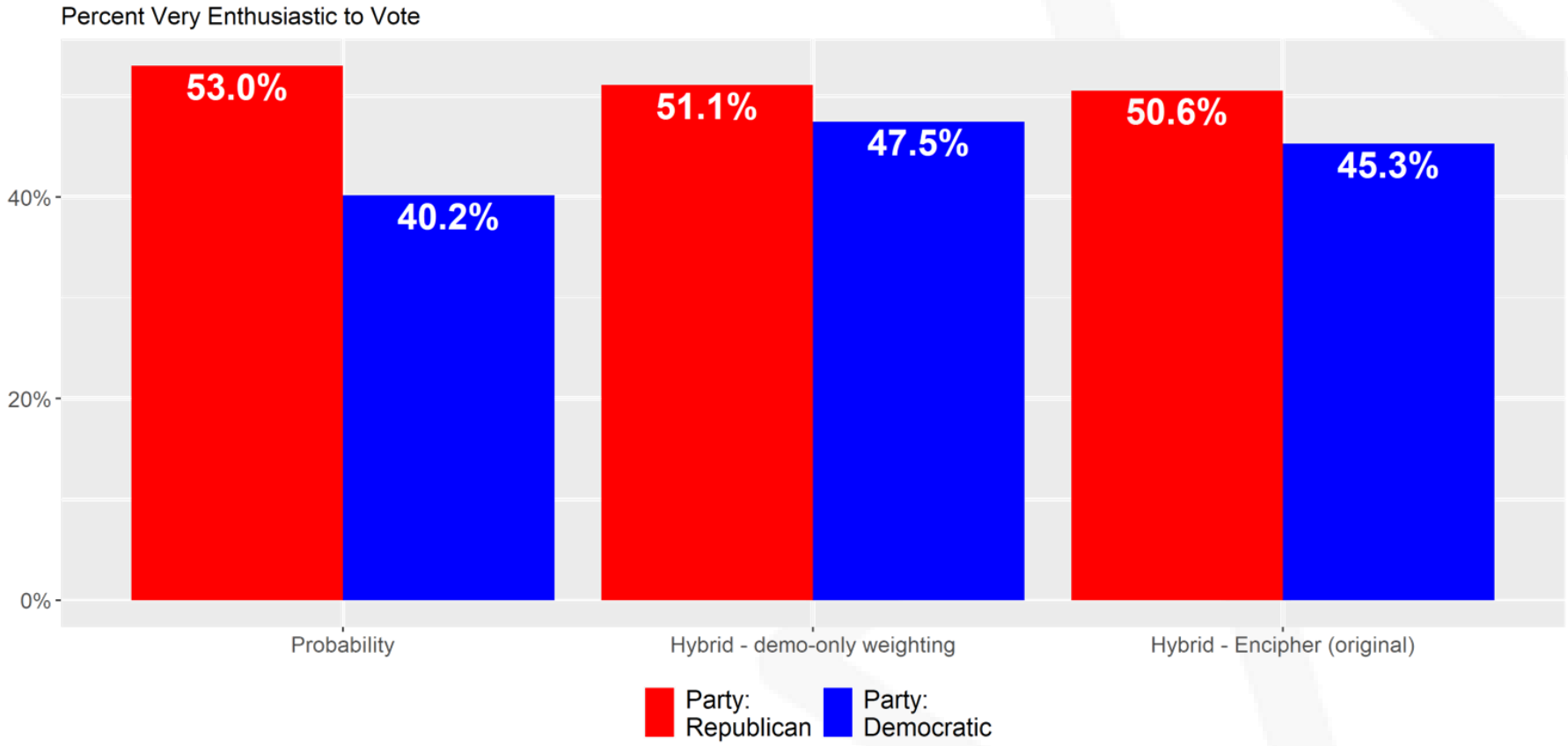


Example: The Midterm “Enthusiasm Gap”



Testing Improvements to Encipher Hybrid

MODIFICATION 1

- Adjust optimization routine to include subgroup estimates in average bias

MODIFICATION 2

- Prior to calibration, add “pseudo base weighting” of nonprobability sample using a random forest propensity model

Propensity Adjustment Procedure

Run random forest propensity model
- Dependent Variable: Presence in nonprobability sample
- Predictors: Demographics, calibration variables, and key outcomes

Assign propensity score to all probability and nonprobability cases

Divide sample into deciles (“pseudo-strata”) based on the propensity score

Calculate pseudo base weight

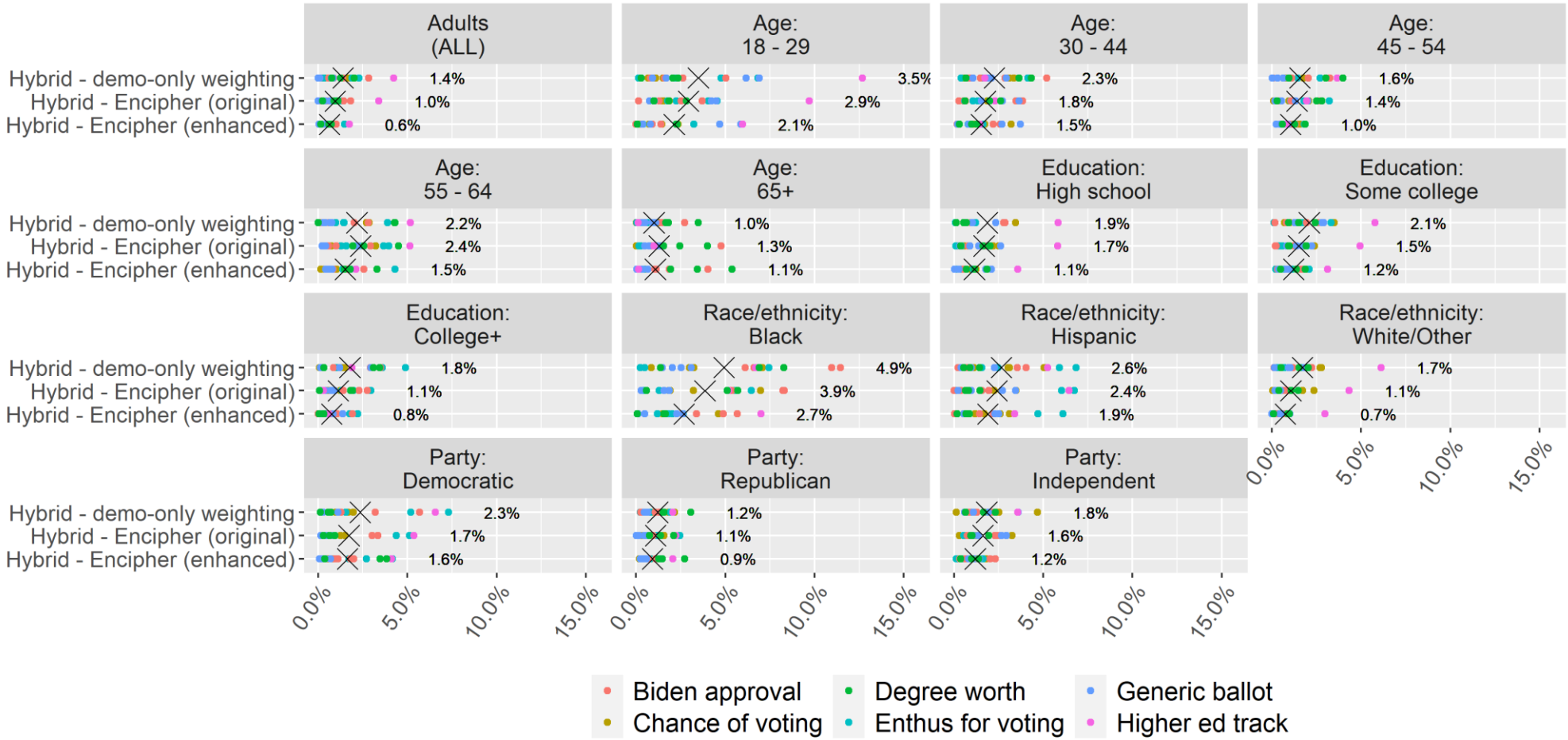
Pseudo Base Weight Formula

$$NP\_ADJ_d = \frac{1 - \left(\frac{N_{n,d}}{N_{n,d} + N_{p,d}}\right)}{\left(\frac{N_{n,d}}{N_{n,d} + N_{p,d}}\right)}$$

$N_{n,d}$ = count of nonprobability completes (unweighted) in decile *d*

$N_{p,d}$ = sum of base weights of probability completes in decile *d*

Average Selection Bias in Hybrid Estimates, by Subgroup



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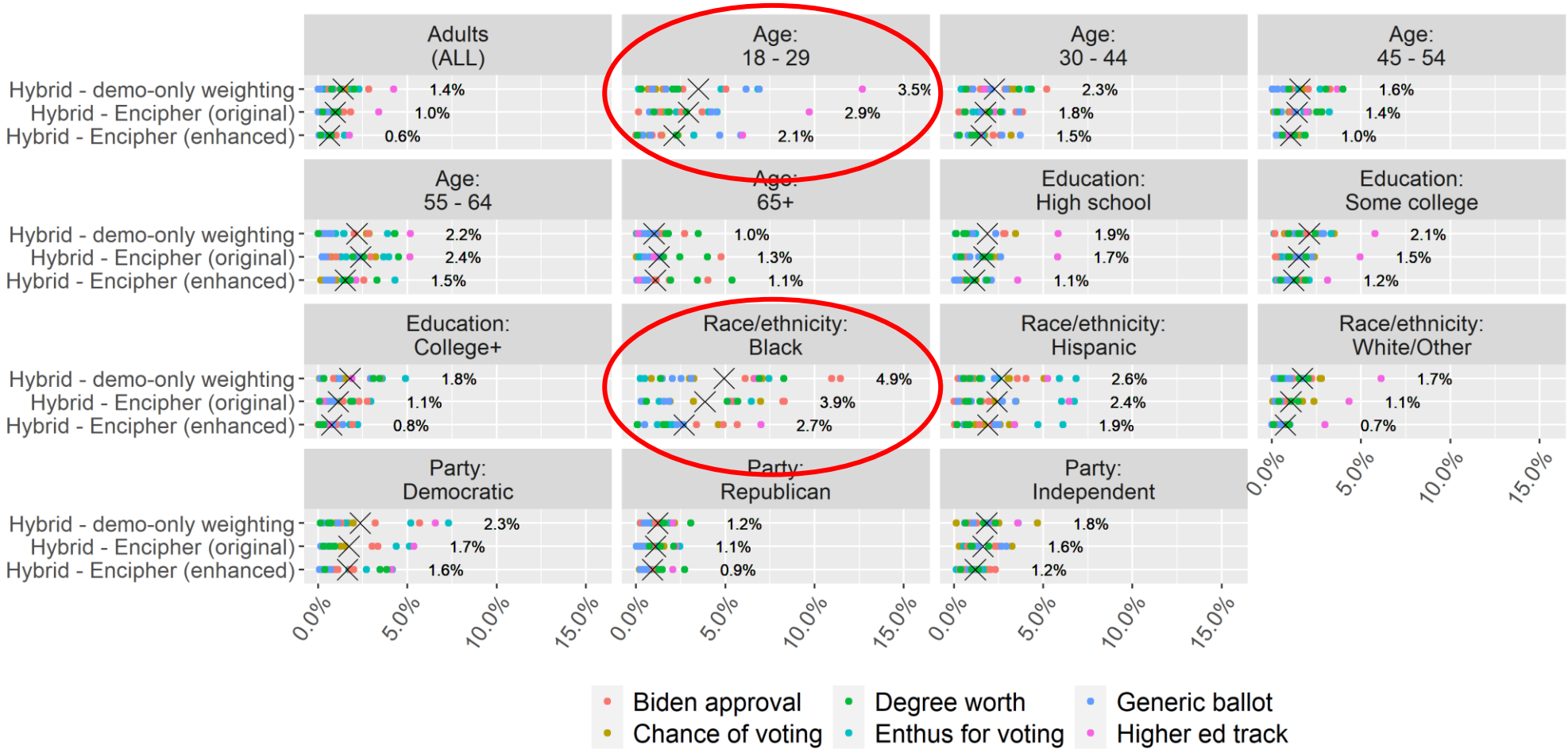

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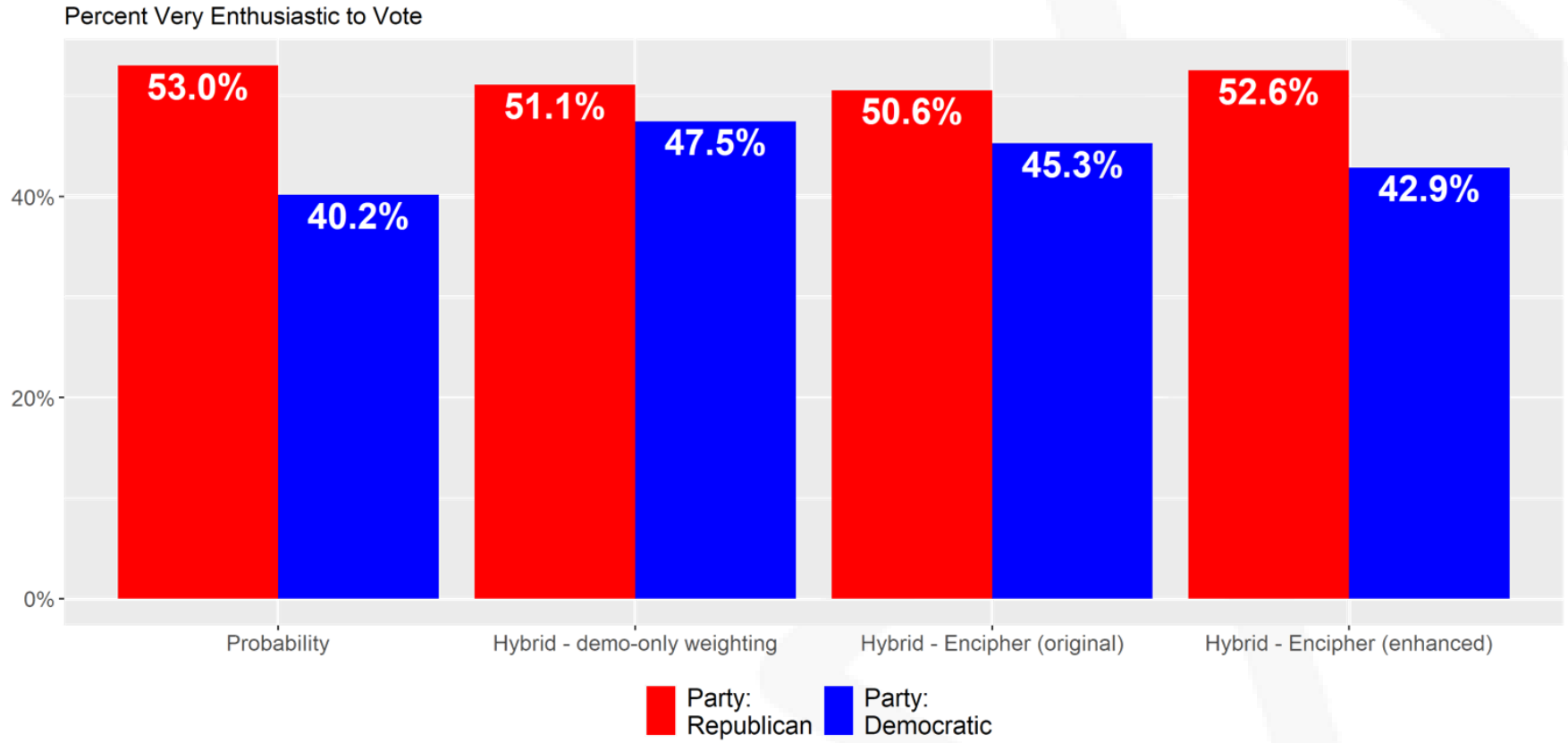
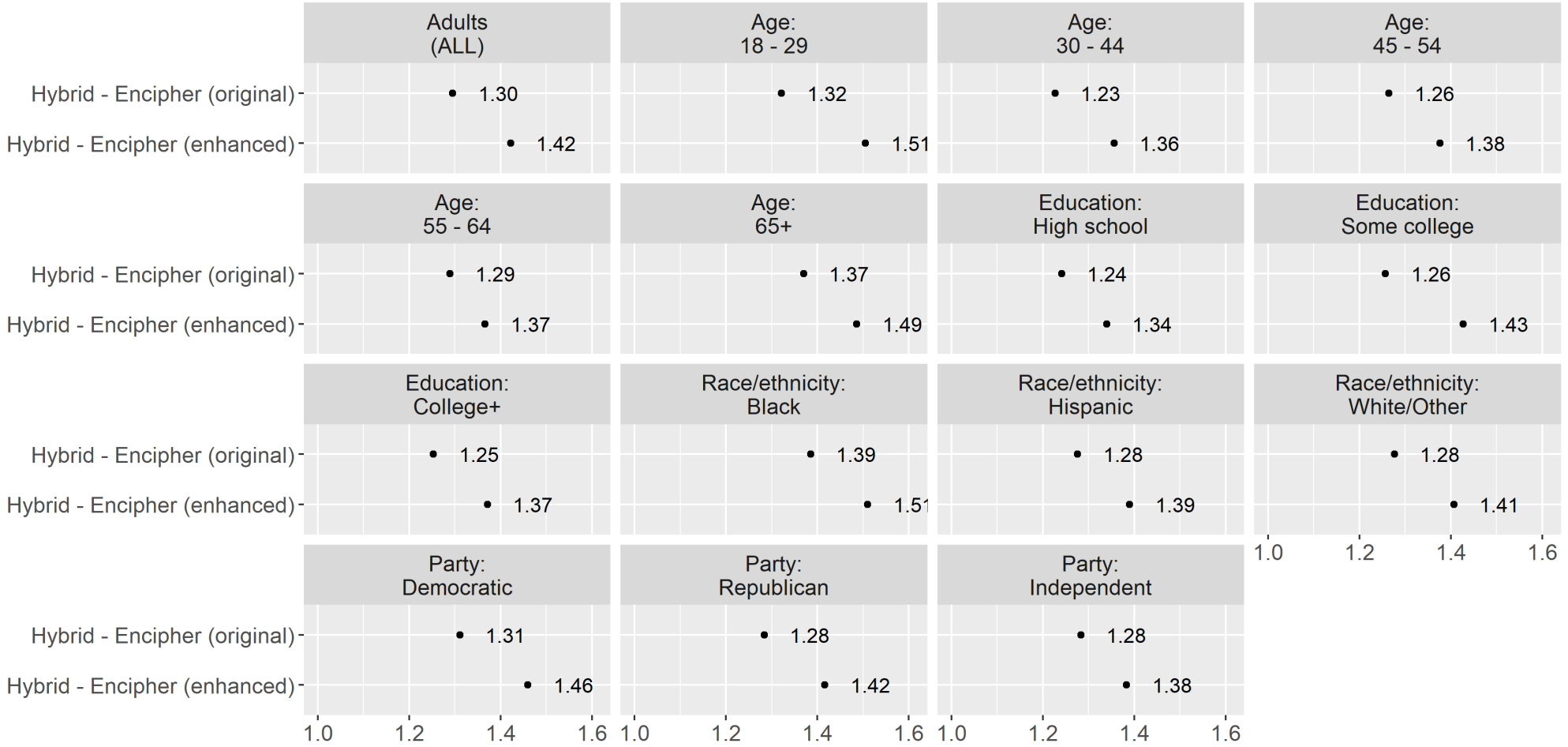


Unequal Weighting Effect



Conclusions

- Pre-calibration propensity adjustment appears to help pick up interactions between demographics and key outcomes that are "missed" by calibration
- Therefore, propensity adjustments add value to hybrid weighting when subgroup estimates are of interest
- Pre-calibration propensity adjustment has been added as standard component of SSRS Encipher Hybrid methodology when sample sizes permit
- Future extension: Test adaptation of Kern et al.'s universal adaptability for propensity adjustment

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THANK YOU, AAPOR!

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