Supplementary Materials for The Weighted Priors Approach for Combining Expert Opinions in Logistic Regression Experiments

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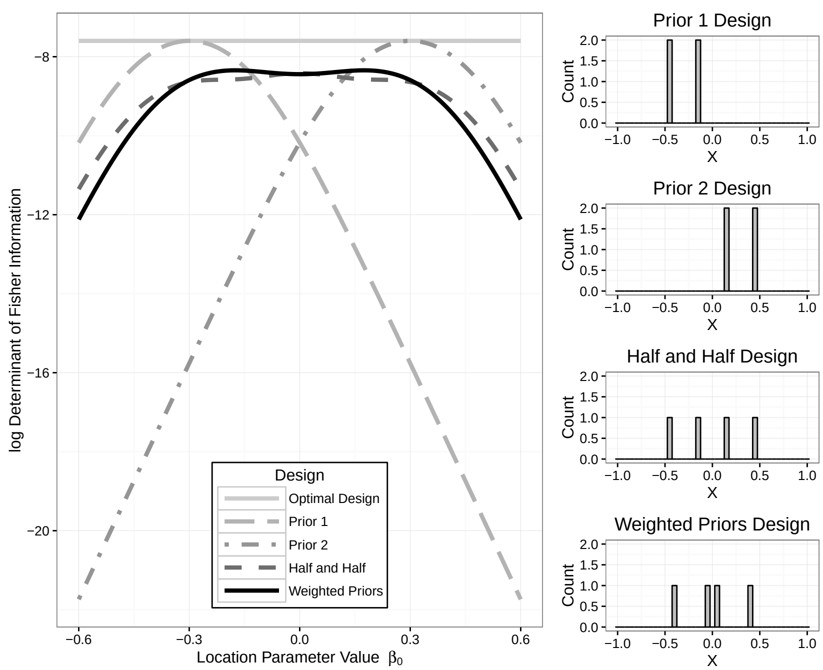

Figure S.1: Comparison of performance for four constructed designs for a range of location parameter values β_0. The priors have parameter values $\beta_0 = \pm 0.3$ and $\beta_1 = 10$. The WP design uses $\omega = 0.5$. The WP and Half and Half design never reach optimality but are robust when compared to the individual prior designs. The WP design has a slight gain in performance for location parameter values in between the given priors when compared to the Half and Half design.

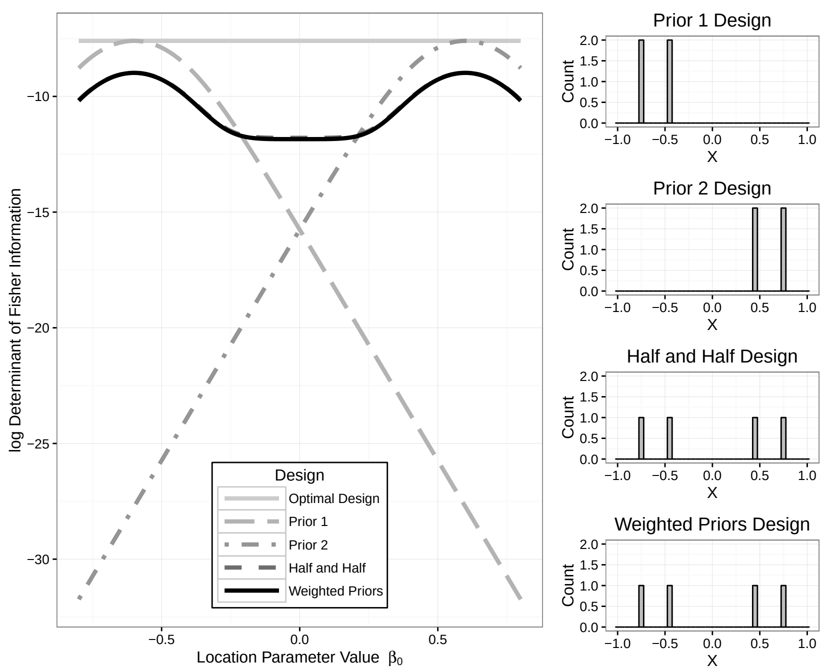

Figure S.2: Comparison of performance for four constructed designs for a range of location parameter values β_0. The priors have parameter values $\beta_0 = \pm 0.6$ and $\beta_1 = 10$. The WP design uses $\omega = 0.5$. The WP and Half and Half design never reach optimality but are robust when compared to the individual prior designs. Since the priors are so far apart there is no shared information and the Half and Half design is equivalent to the WP design for $\omega = 0.5$.

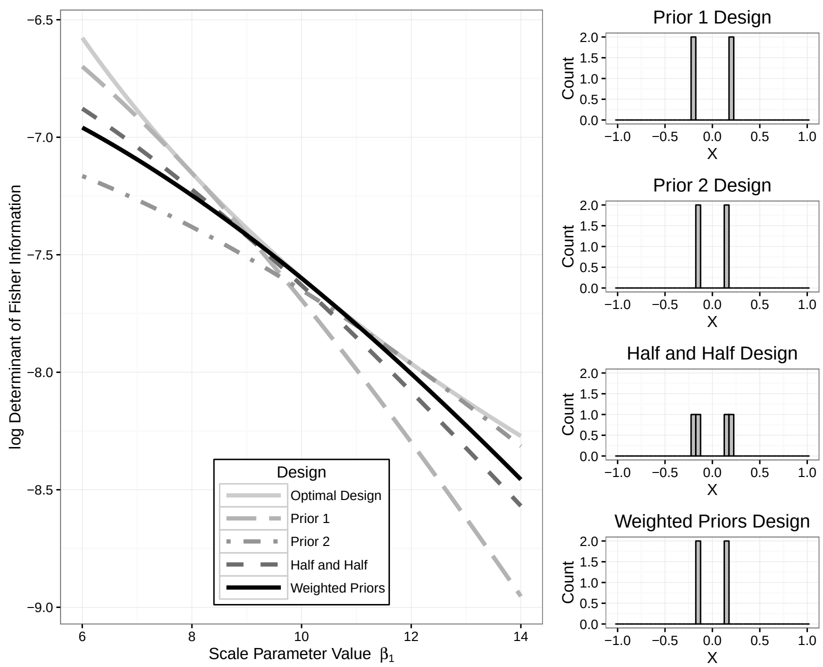

Figure S.3: Comparison of performance for four constructed designs for a range of scale parameter values β_1. The priors have parameter values $\beta_0 = 0$ and $\beta_1 = 8$ or 12. The WP design uses $\omega = 0.5$. The WP design reaches optimality in between the two prior parameter values and is robust when compared to the individual prior designs.

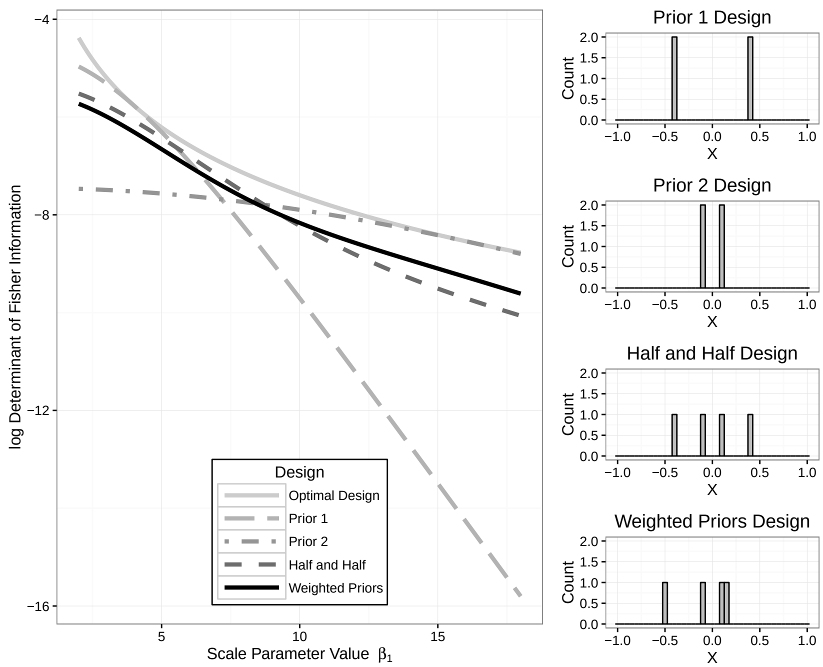

Figure S.4: Comparison of performance for four constructed designs for a range of scale parameter values β_1. The priors have parameter values $\beta_0 = 0$ and $\beta_1 = 4$ or 16. The WP design uses $\omega = 0.5$. The WP design takes on an unintuitive shape here and places more weight on the prior with $\beta_1 = 16$ to avoid the threat of separation.

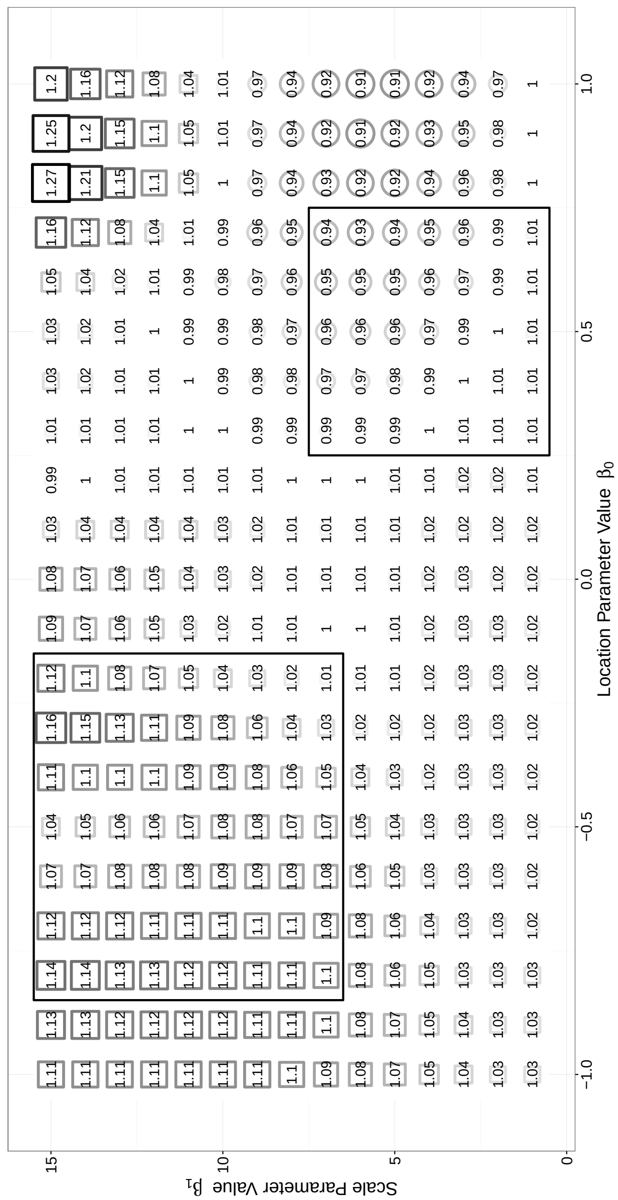

Figure S.5: Efficiency plot comparing the motivating example design with $\omega = 0.75$ to a design with 6 points allocated for the optimistic prior and 2 points to the pessimistic prior. Values larger than 1 (marked with squares) indicate that the $\omega = 0.75$ design is performing better while values less than 1 (marked with circles) indicate it is performing worse. The black rectangles represent 95% confidence bounds for the two sets of prior values given in Figure 1. The $\omega = 0.75$ design has better overall performance, and favors the pessimistic prior.

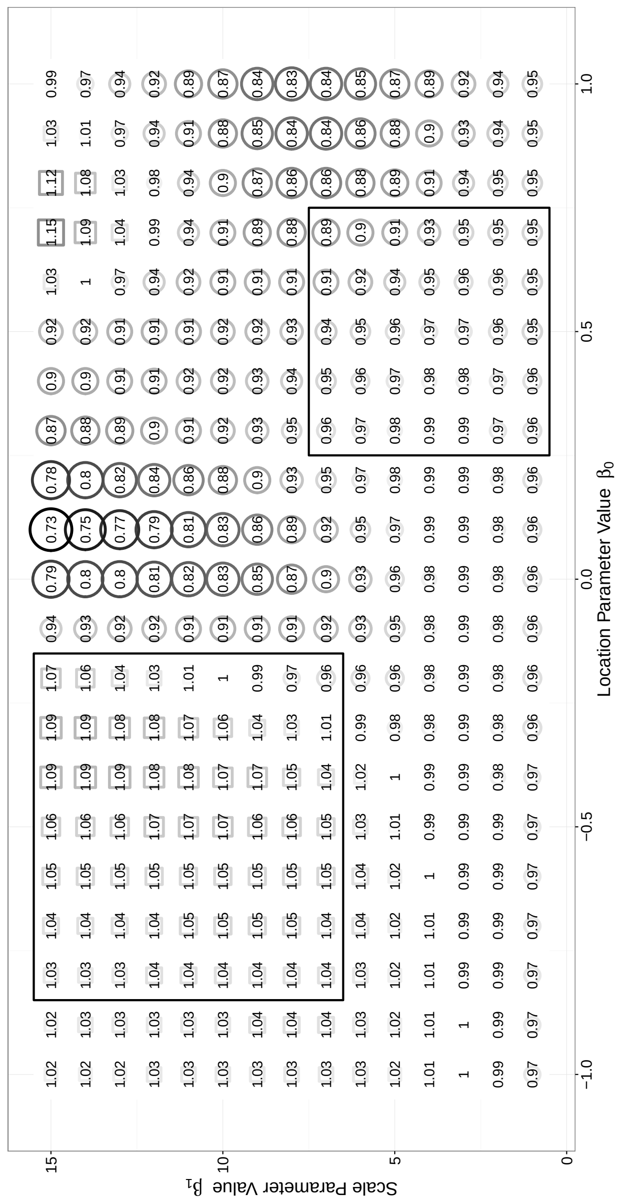

Figure S.6: Efficiency plot comparing the motivating example design with optimal four point designs for each prior individually. Values larger than 1 (marked with squares) indicate that the $\omega = 0.5$ design is performing better while values less than 1 (marked with circles) indicate it is performing worse. The black rectangles represent 95% confidence bounds for the two sets of prior values given in Figure 1. The $\omega = 0.5$ design has better overall performance, and favors the pessimistic prior.

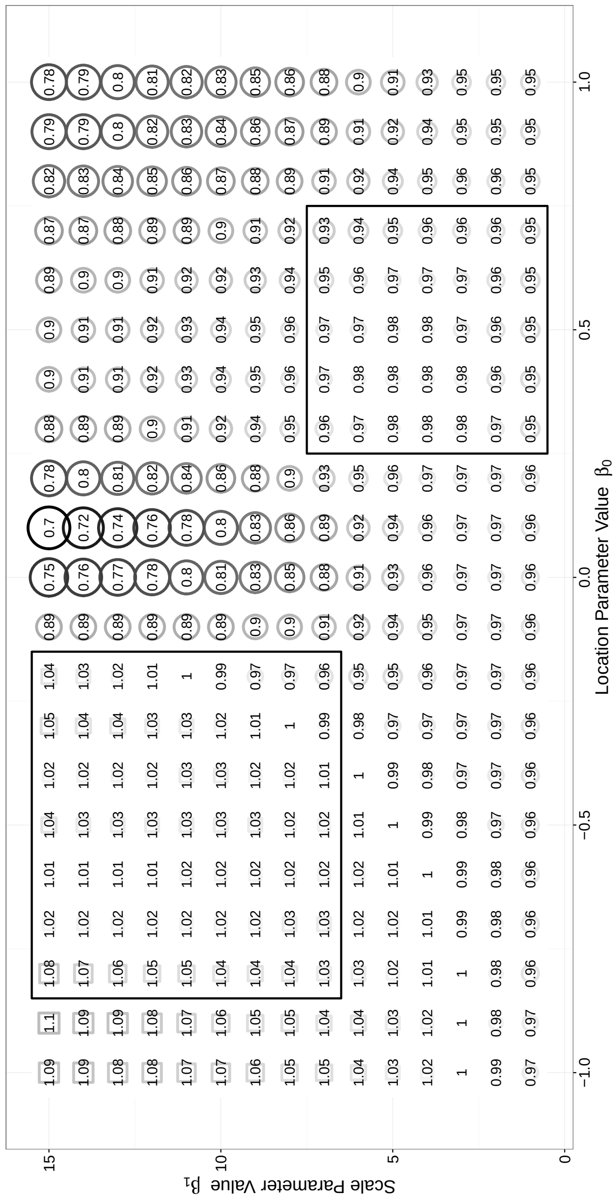

Figure S.7: Efficiency plot comparing the motivating example design with $\omega = 0.25$ to a design with 2 points allocated for the optimistic prior and 6 points to the pessimistic prior. Values larger than 1 (marked with squares) indicate that the $\omega = 0.25$ design is performing better while values less than 1 (marked with circles) indicate it is performing worse. The black rectangles represent 95% confidence bounds for the two sets of prior values given in Figure 1. As with Figures S.5 and S.6 the WP design favors better performance for the more pessimistic prior.

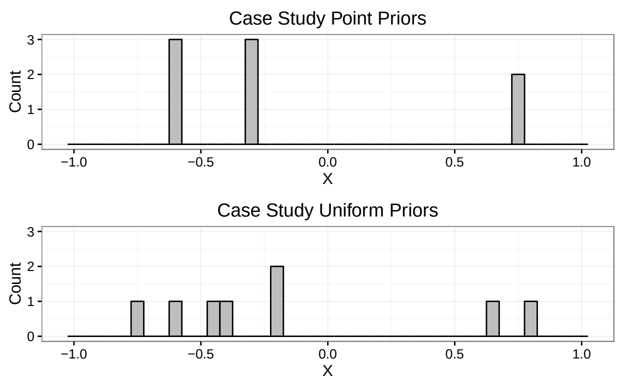

Figure S.8: Designs for the motivating example scenario with point priors (top) and with uniform priors that have the same mean and variance as the normal priors (bottom)

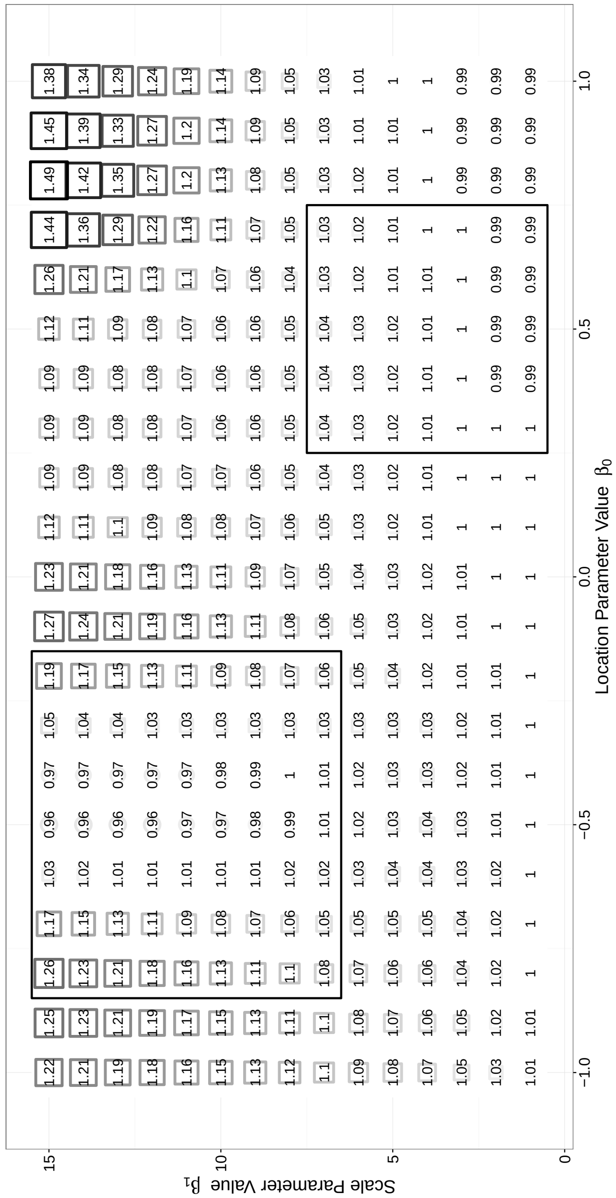

Figure S.9: Efficiency plot comparing the motivating example design with point priors to normally distributed priors. The values larger than 1 (marked with squares) indicate that the design with uncertainty is performing better. Values less than 1 (marked with circles) indicate that the point prior design is performing better. The black rectangles represent 95% confidence bounds for the two sets of prior values given in Figure 1. Again, the design that accounts for uncertainty in the priors performs better for most of the scale/location parameter sets.

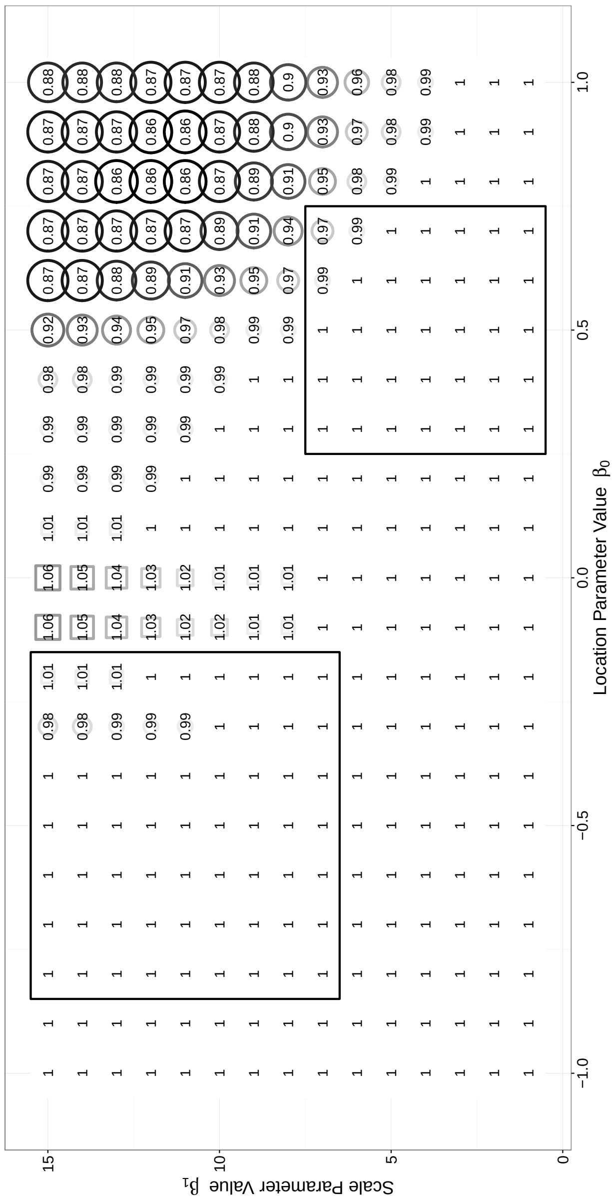

Figure S.10: Efficiency plot comparing the motivating example design with $\omega = 0.5$ to a design the same mean and variance with uniform priors. Values larger than 1 (marked with squares) indicate that the design with normal priors performs better while values less than 1 (marked with circles) indicate it performed worse.