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3 **selscan 2.0: scanning for sweeps in unphased data**

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5 **Table S1.** Demographic history parameters for simulations.  $N_A$  represents the ancestral effective  
 6 population size.  $N_0$  represents the effective population size of the population experiencing the sweep.  $N_0$   
 7 represents the effective population size of the non-sweep population.  $t_d$  represents the split time between  
 8 the two populations.

	$N_A$	$N_0$ at split	$N_0$ at present	$N_1$ at split	$N_1$ at present	$t_d$
Demo 1	10,000	10,000	10,000	10,000	10,000	2,000/4,000/8,000
Demo 2	10,000	10,000	10,000	5,000	5,000	2,000/4,000/8,000
Demo 3	10,000	5,000	5,000	10,000	10,000	2,000/4,000/8,000
Demo 4	10,000	10,000	50,000 <sup>†</sup>	10,000	10,000	2,000/4,000/8,000
Demo 5	10,000	10,000	10,000	10,000	50,000 <sup>†</sup>	2,000/4,000/8,000

9 <sup>†</sup>The reached via exponential growth starting 2,000 generations ago.

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11 **Table S2.** False positive rate computed from neutral simulations for varying  $t_d$  and demographic history  
 12 with  $n = 100$  diploid samples (from each population for XP-EHH and XP-nSL).

		$t_d = 2000$	$t_d = 4000$	$t_d = 8000$
iHS	Demo 1	0.013	0.1	0.009
	Demo 3	0.007	0.013	0.007
	Demo 4	0.015	0.018	0.008
nSL	Demo 1	0.01	0.015	0.008
	Demo 3	0.008	0.011	0.007
	Demo 4	0.014	0.021	0.014
XP-EHH	Demo 1	0.013	0.013	0.016
	Demo 2	0.017	0.009	0.015
	Demo 3	0.01	0.011	0.012
	Demo 4	0.012	0.014	0.014
	Demo 5	0.011	0.012	0.013
XP-nSL	Demo 1	0.014	0.011	0.013
	Demo 2	0.019	0.011	0.012
	Demo 3	0.011	0.011	0.012
	Demo 4	0.012	0.012	0.014
	Demo 5	0.011	0.012	0.014

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24 **Table S3.** False positive rate computed from neutral simulations for varying  $t_d$  and demographic history  
 25 with  $n = 50$  diploid samples (from each population for XP-EHH and XP-nSL).

		$t_d = 2000$	$t_d = 4000$	$t_d = 8000$
iHS	Demo 1	0.012	0.007	0.01
	Demo 3	0.015	0.009	0.009
	Demo 4	0.01	0.005	0.014
nSL	Demo 1	0.014	0.012	0.01
	Demo 3	0.01	0.012	0.011
	Demo 4	0.007	0.013	0.013
XP-EHH	Demo 1	0.015	0.01	0.015
	Demo 2	0.018	0.009	0.013
	Demo 3	0.009	0.014	0.013
	Demo 4	0.011	0.011	0.015
	Demo 5	0.012	0.016	0.02
XP-nSL	Demo 1	0.014	0.01	0.012
	Demo 2	0.018	0.011	0.013
	Demo 3	0.009	0.014	0.014
	Demo 4	0.011	0.013	0.014
	Demo 5	0.012	0.015	0.022

26 **Table S4.** False positive rate computed from neutral simulations for varying  $t_d$  and demographic history  
 27 with  $n = 20$  diploid samples (from each population for XP-EHH and XP-nSL).  
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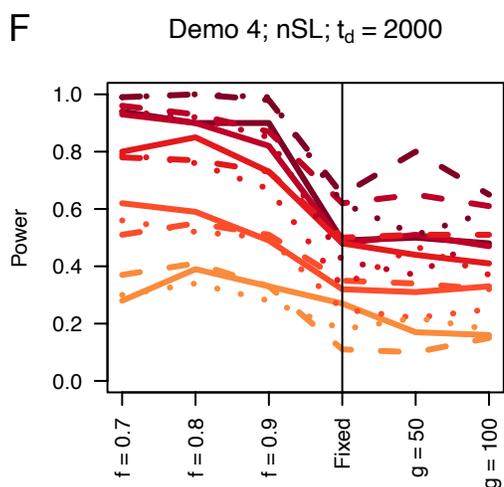
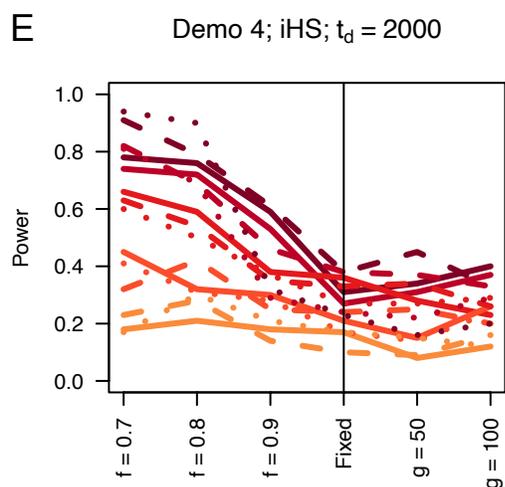
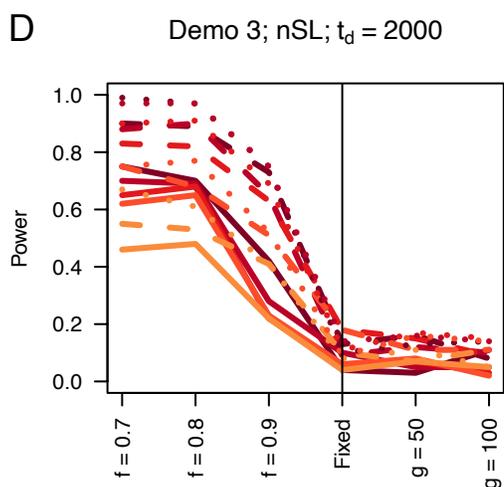
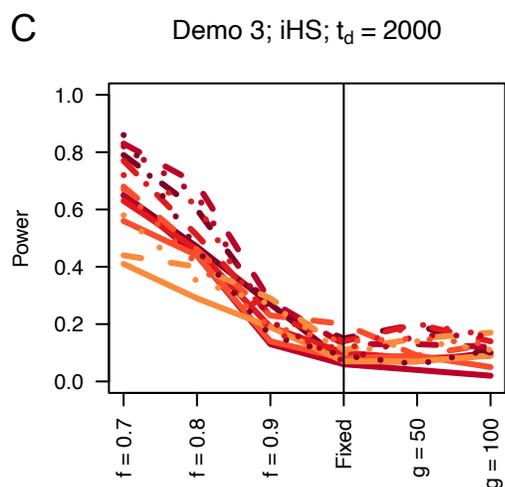
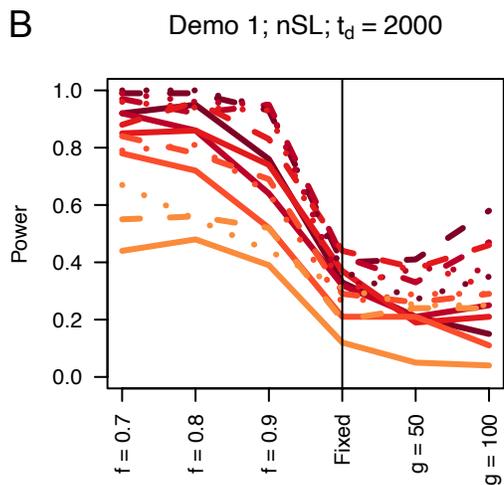
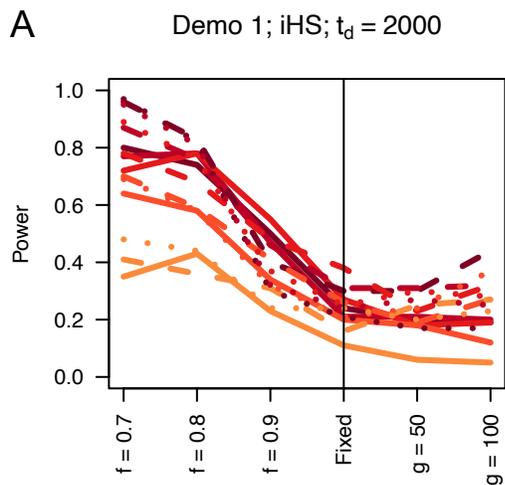
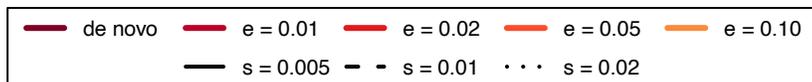
		$t_d = 2000$	$t_d = 4000$	$t_d = 8000$
iHS	Demo 1	0.001	0.003	0.002
	Demo 3	0.004	0.002	0.003
	Demo 4	0.002	0.0	0.003
nSL	Demo 1	0.001	0.002	0.0
	Demo 3	0.002	0.003	0.002
	Demo 4	0.0	0.0	0.002
XP-EHH	Demo 1	0.019	0.012	0.015
	Demo 2	0.017	0.006	0.012
	Demo 3	0.011	0.013	0.013
	Demo 4	0.008	0.014	0.013
	Demo 5	0.008	0.013	0.017
XP-nSL	Demo 1	0.018	0.014	0.014
	Demo 2	0.016	0.011	0.011
	Demo 3	0.01	0.013	0.014
	Demo 4	0.009	0.013	0.013
	Demo 5	0.009	0.012	0.02

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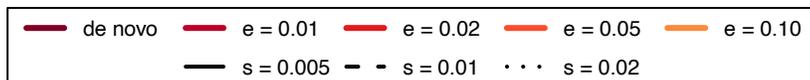
38 **Table S5.** False positive rate computed from neutral simulations for varying  $t_d$  and demographic history  
 39 with  $n = 10$  diploid samples (from each population for XP-EHH and XP-nSL).

		$t_d = 2000$	$t_d = 4000$	$t_d = 8000$
iHS	Demo 1	0.0	0.0	0.0
	Demo 3	0.0	0.0	0.0
	Demo 4	0.0	0.0	0.0
nSL	Demo 1	0.0	0.0	0.0
	Demo 3	0.0	0.0	0.0
	Demo 4	0.0	0.0	0.0
XP-EHH	Demo 1	0.014	0.013	0.014
	Demo 2	0.01	0.008	0.016
	Demo 3	0.01	0.012	0.015
	Demo 4	0.01	0.014	0.012
	Demo 5	0.008	0.019	0.012
XP-nSL	Demo 1	0.012	0.013	0.016
	Demo 2	0.011	0.006	0.013
	Demo 3	0.01	0.013	0.015
	Demo 4	0.01	0.014	0.012
	Demo 5	0.009	0.02	0.01

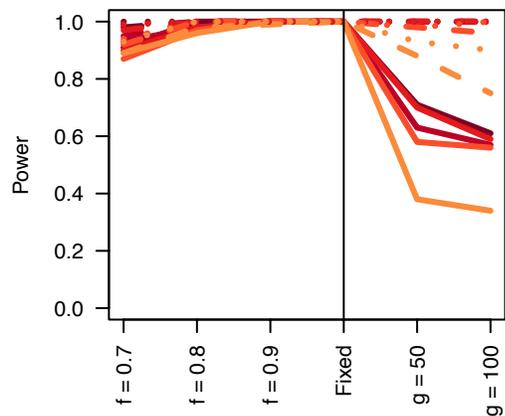
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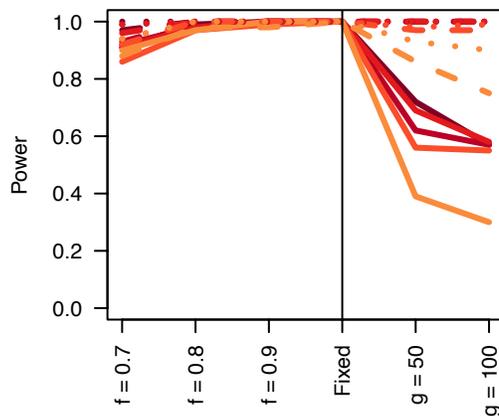
43 **Figure S1.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
44 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$   
45 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
46 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
47 selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



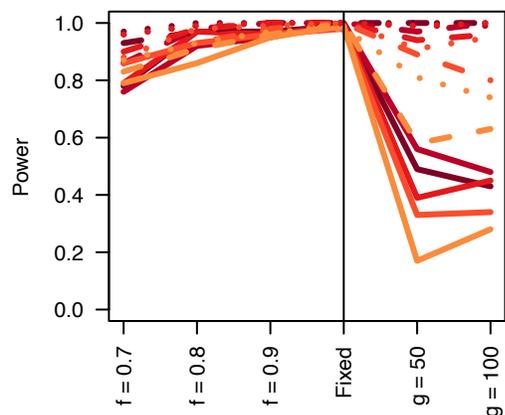
**A** Demo 1; XP-EHH;  $t_d = 2000$



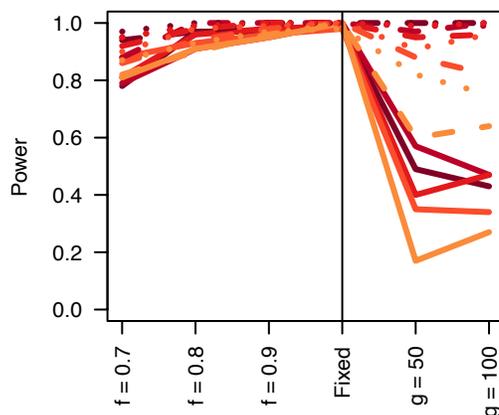
**B** Demo 1; XP-nSL;  $t_d = 2000$



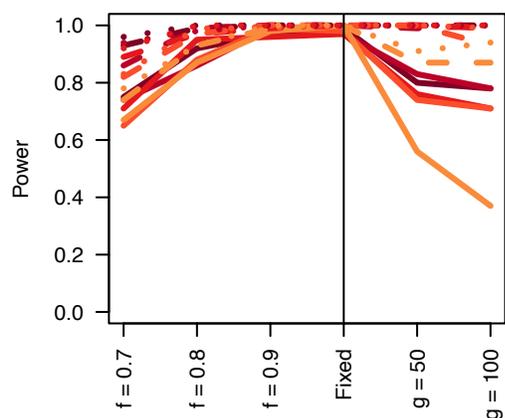
**C** Demo 2; XP-EHH;  $t_d = 2000$



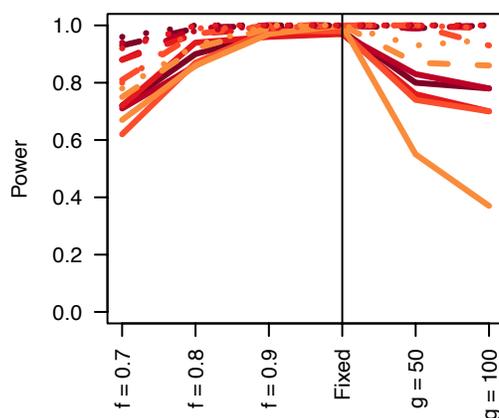
**D** Demo 2; XP-nSL;  $t_d = 2000$



**E** Demo 3; XP-EHH;  $t_d = 2000$

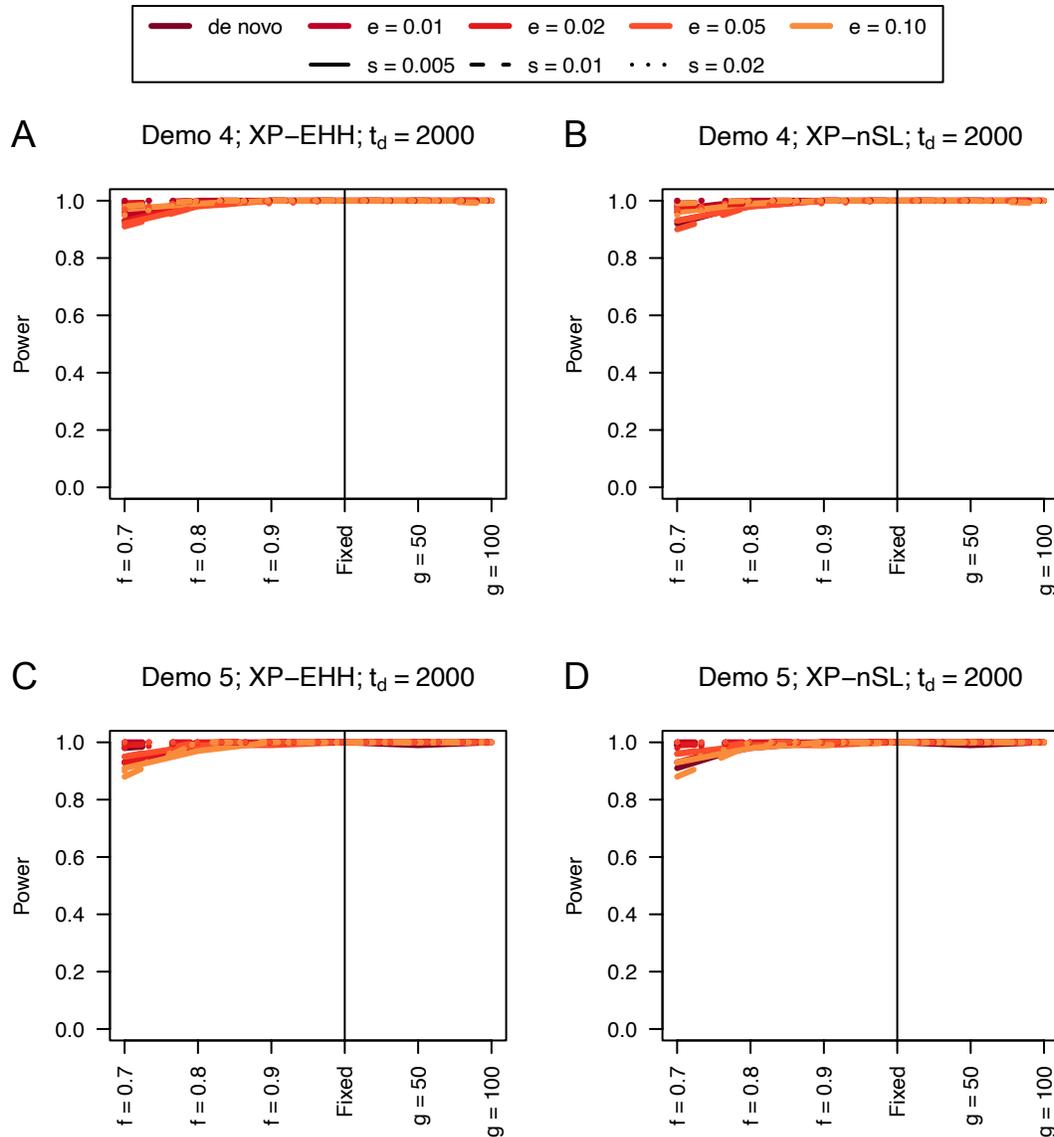


**F** Demo 3; XP-nSL;  $t_d = 2000$



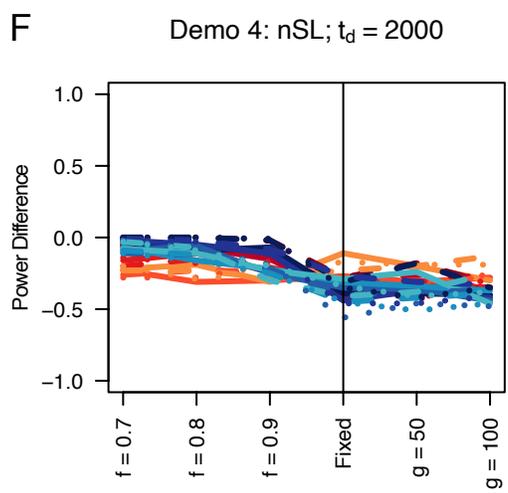
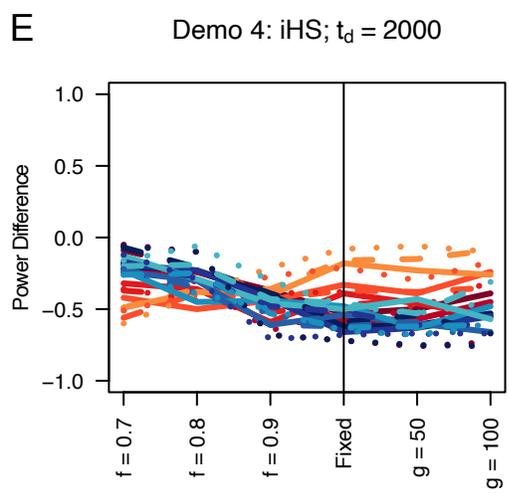
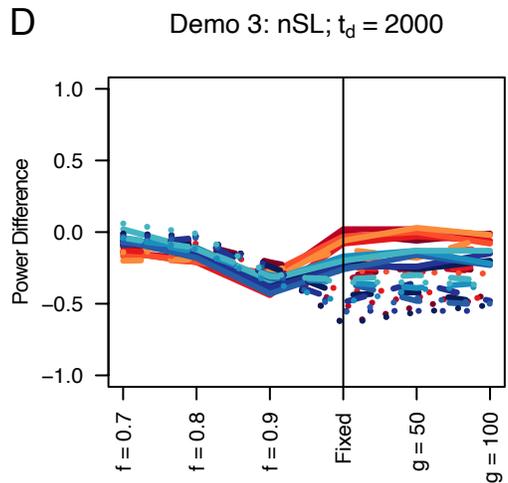
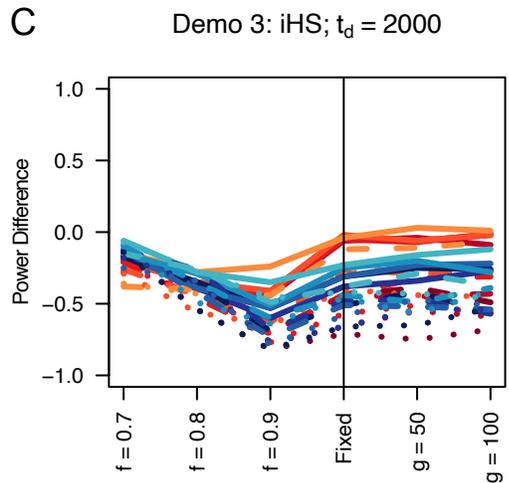
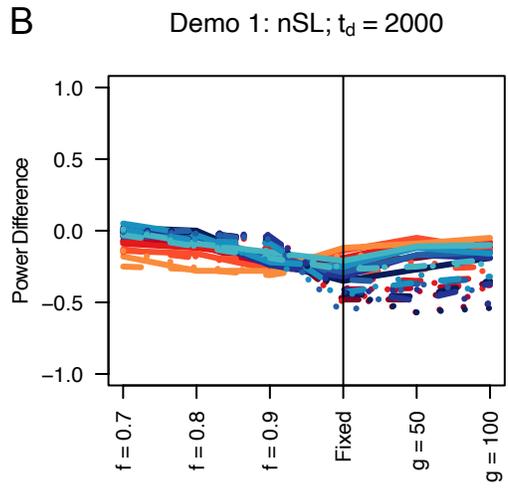
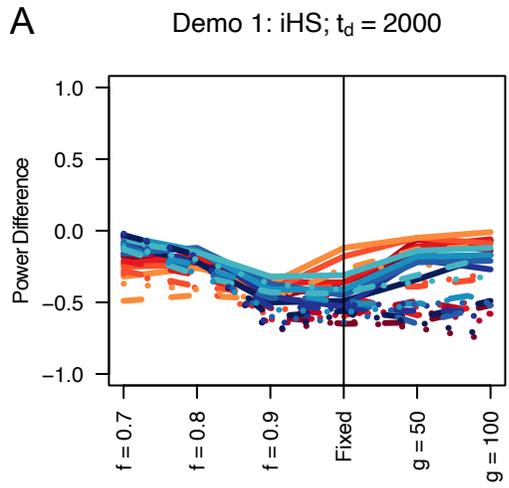
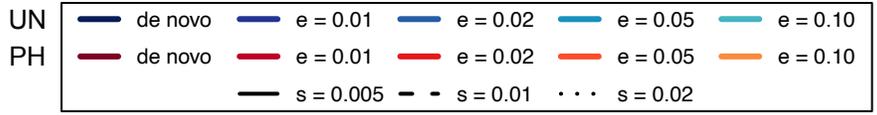
49 **Figure S2.** Power curves for unphased implementations of XP-EHH (A, C, and E) and XP-nSL (B, D,  
50 and F) under demographic histories Demo 1 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n$   
51 = 100 diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the  
52 adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is  
53 the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two  
54 populations diverged.

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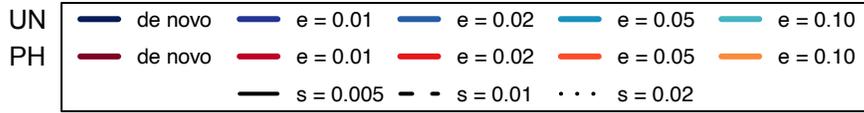


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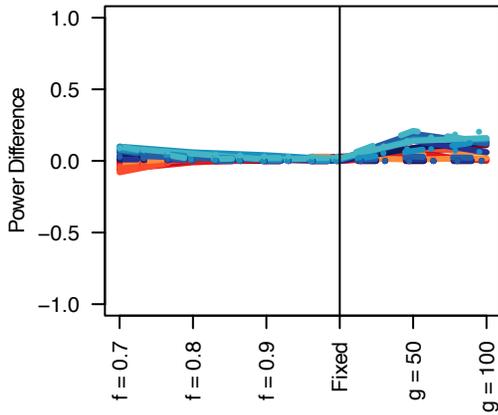
**Figure S3.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 100$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



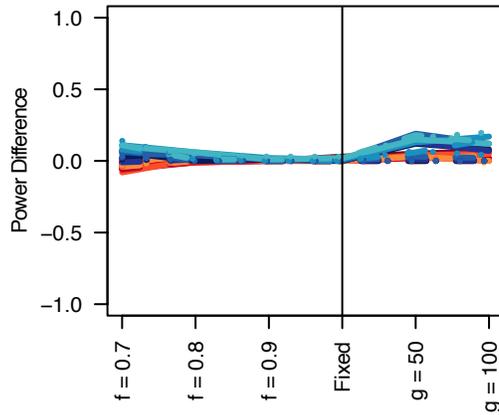
75 **Figure S4.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
76 and F) and phased implementations. Blue curves represent the power difference between the unphased  
77 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
78 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
79 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
80 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$  diploid samples.  $s$  is the selection coefficient,  
81  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
82 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
83 generations since the two populations diverged.



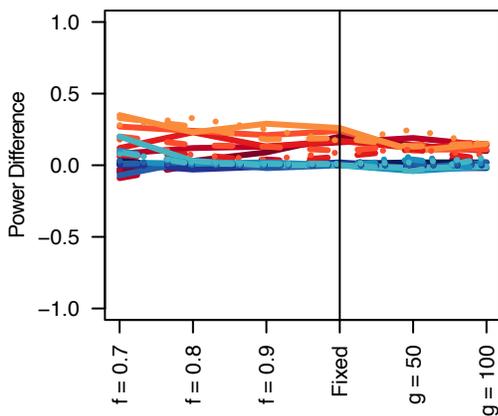
**A** Demo 1: XP-EHH;  $t_d = 2000$



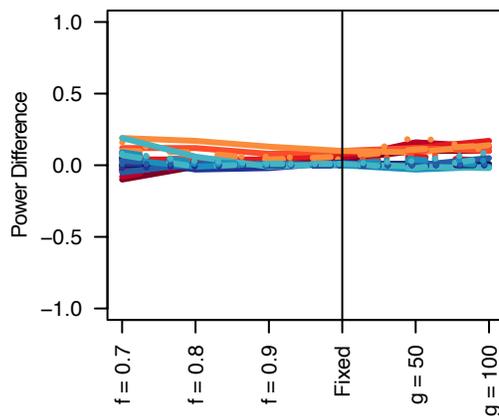
**B** Demo 1: XP-nSL;  $t_d = 2000$



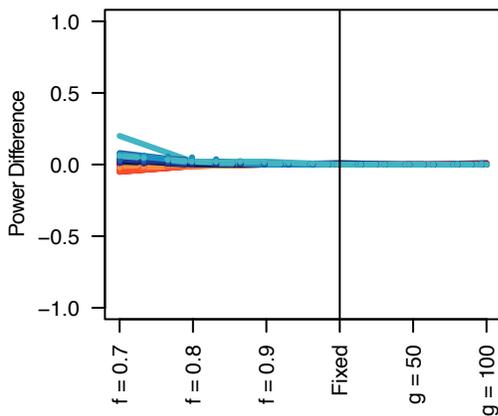
**C** Demo 2: XP-EHH;  $t_d = 2000$



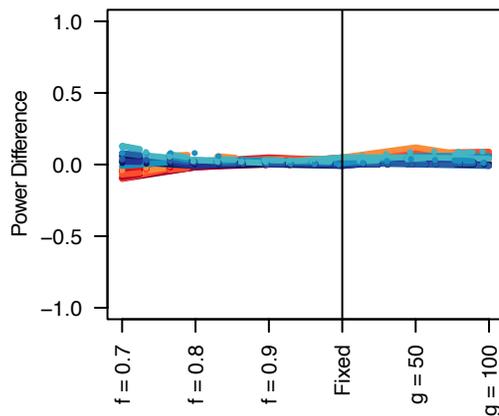
**D** Demo 2: XP-nSL;  $t_d = 2000$



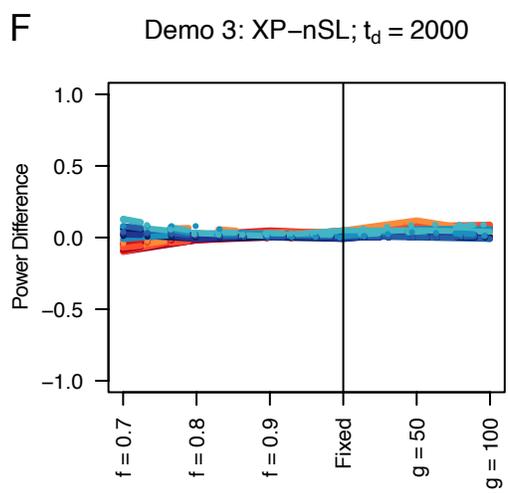
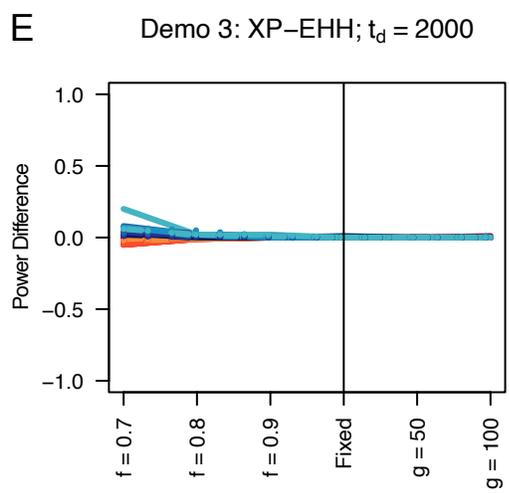
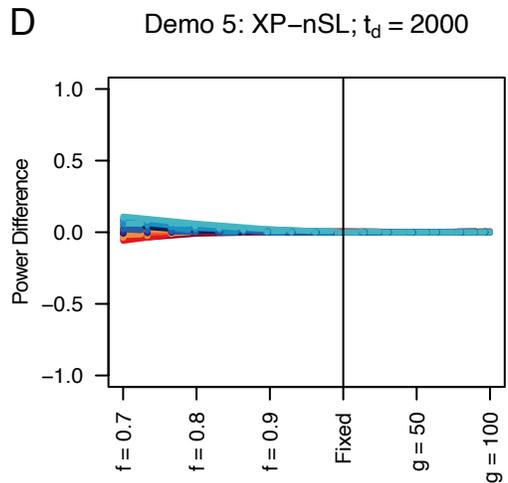
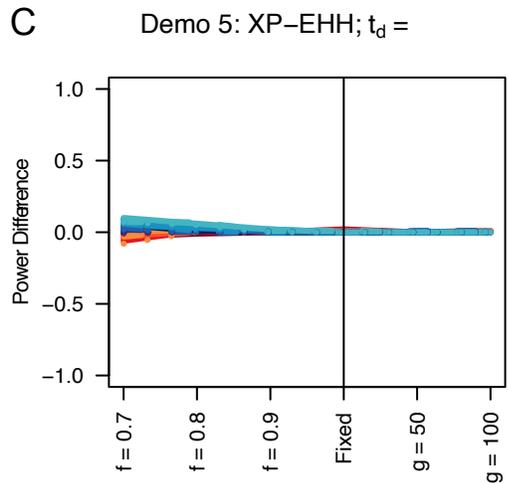
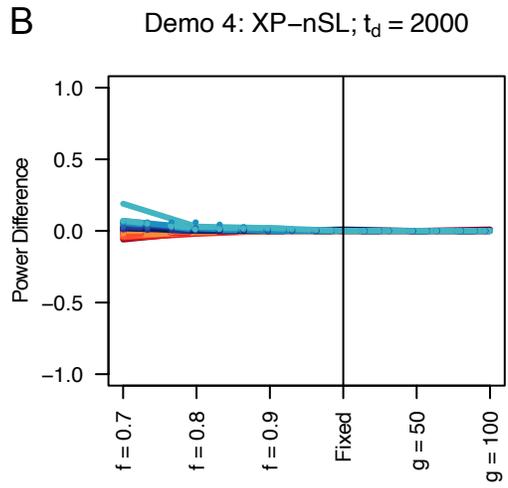
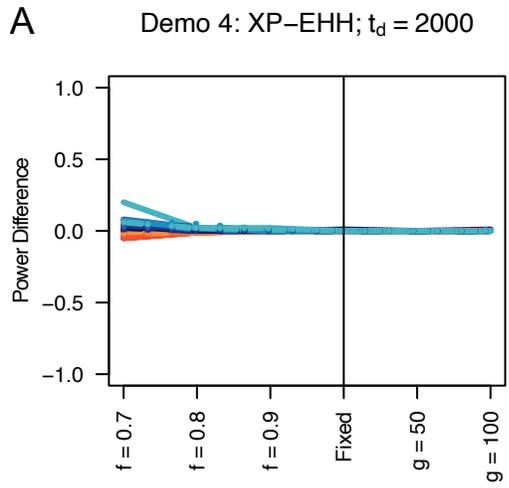
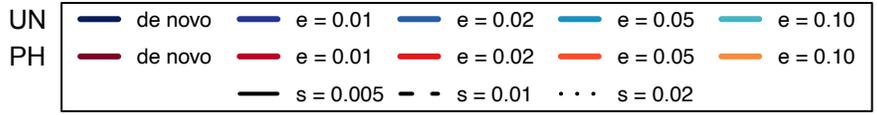
**E** Demo 3: XP-EHH;  $t_d = 2000$



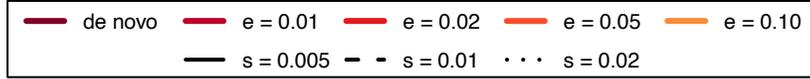
**F** Demo 3: XP-nSL;  $t_d = 2000$



85 **Figure S5.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
86 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
87 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
88 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
89 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
90 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 100$  diploid samples from each population.  
91  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
92 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
93 2000 is the time in generations since the two populations diverged.

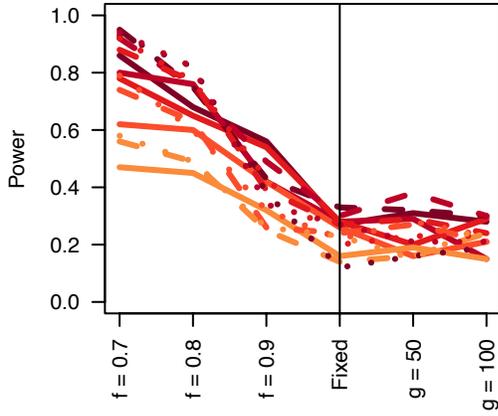


95 **Figure S6.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B  
96 and D) and phased implementations. Blue curves represent the power difference between the unphased  
97 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
98 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
99 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and  
100 B), and Demo 5 (C and D) with  $n = 100$  diploid samples from each population.  $s$  is the selection  
101 coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at  
102 time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
103 generations since the two populations diverged.



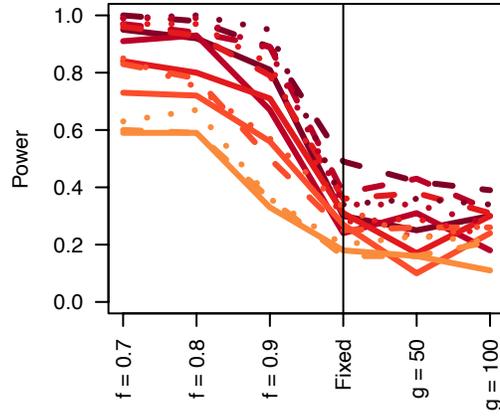
**A**

Demo 1; iHS;  $t_d = 4000$



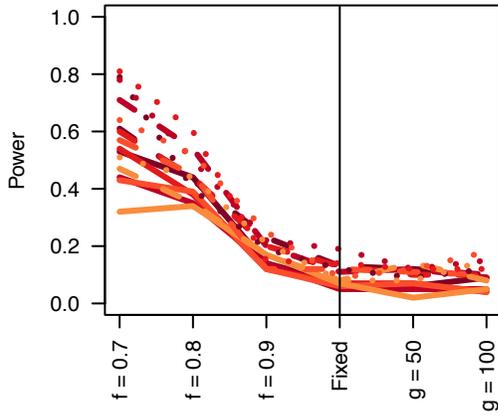
**B**

Demo 1; nSL;  $t_d = 4000$



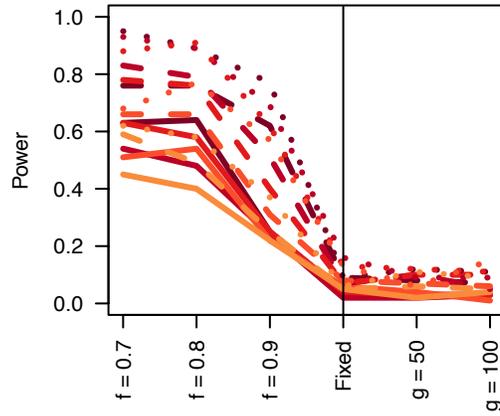
**C**

Demo 3; iHS;  $t_d = 4000$



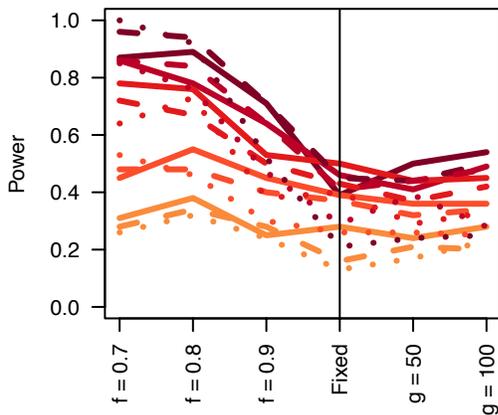
**D**

Demo 3; nSL;  $t_d = 4000$



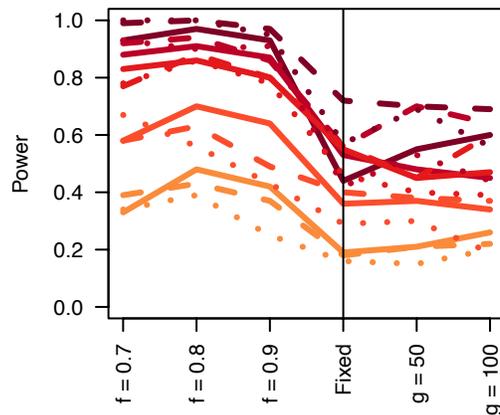
**E**

Demo 4; iHS;  $t_d = 4000$

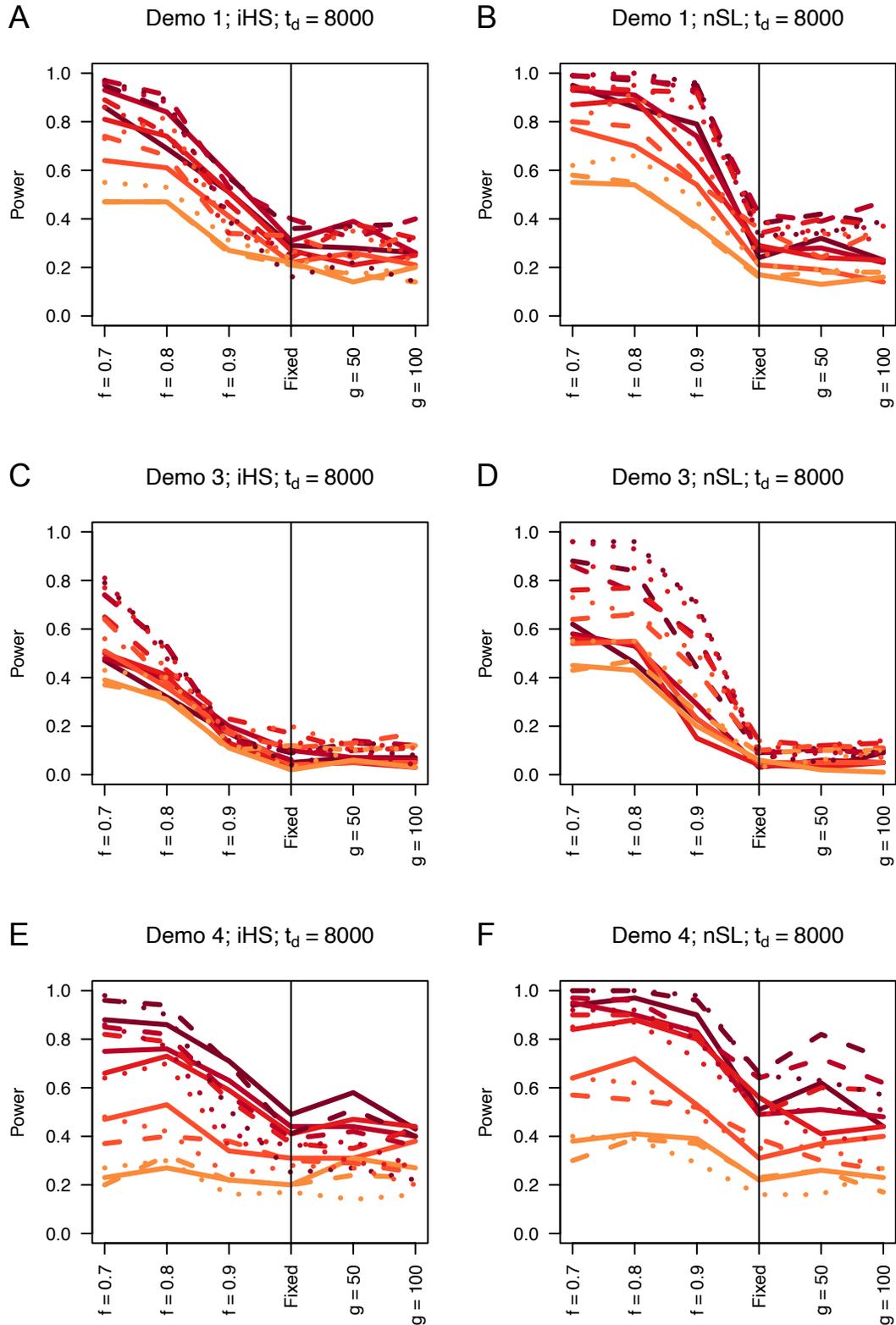
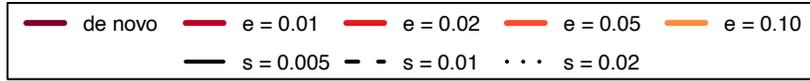


**F**

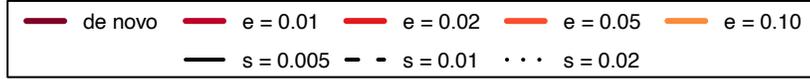
Demo 4; nSL;  $t_d = 4000$



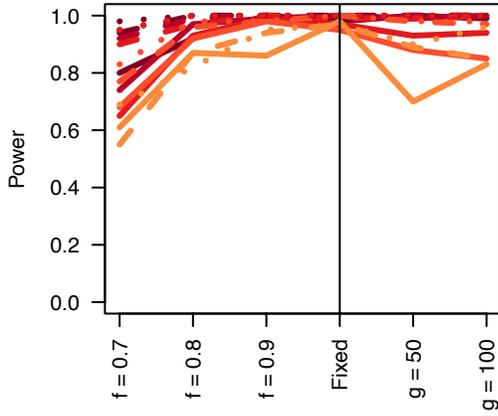
105 **Figure S7.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
106 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$   
107 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
108 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
109 selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



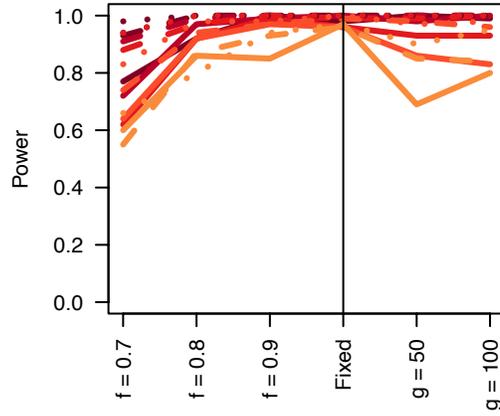
111 **Figure S8.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
112 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$   
113 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
114 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
115 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



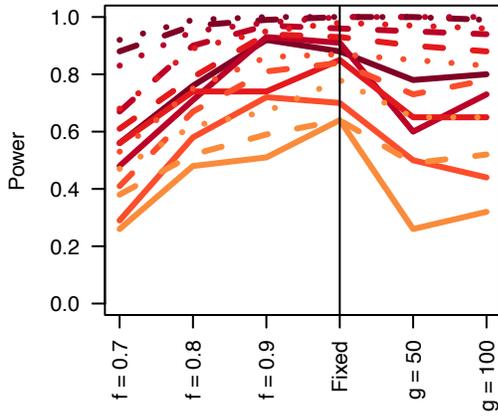
**A** Demo 1; XP-EHH;  $t_d = 4000$



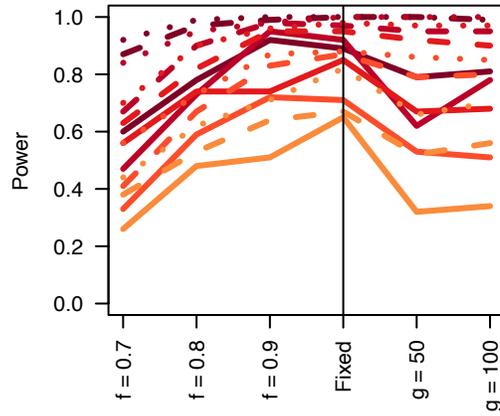
**B** Demo 1; XP-nSL;  $t_d = 4000$



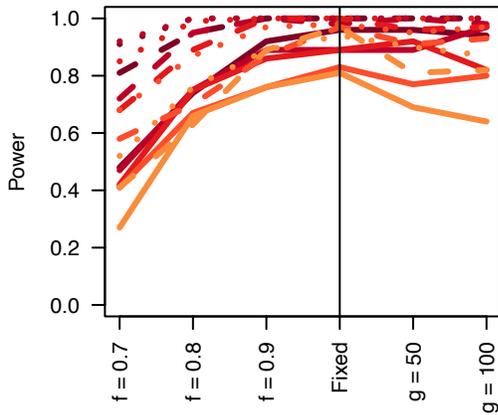
**C** Demo 2; XP-EHH;  $t_d = 4000$



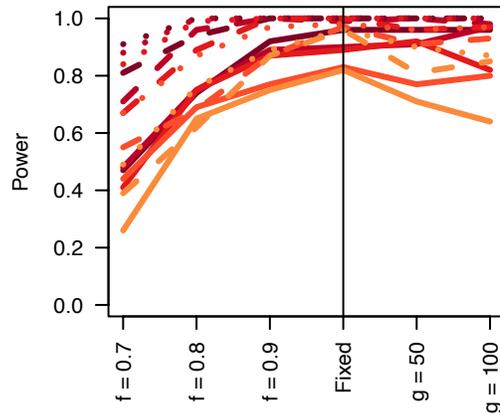
**D** Demo 2; XP-nSL;  $t_d = 4000$



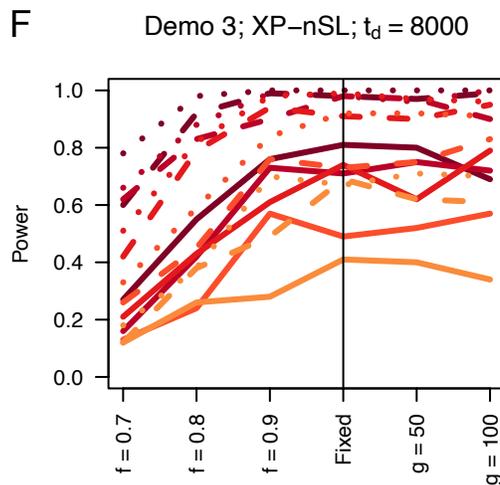
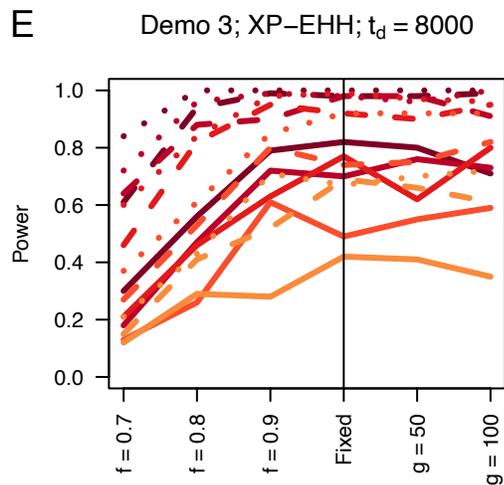
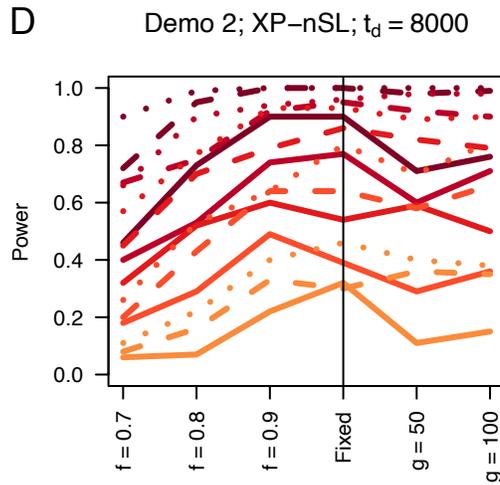
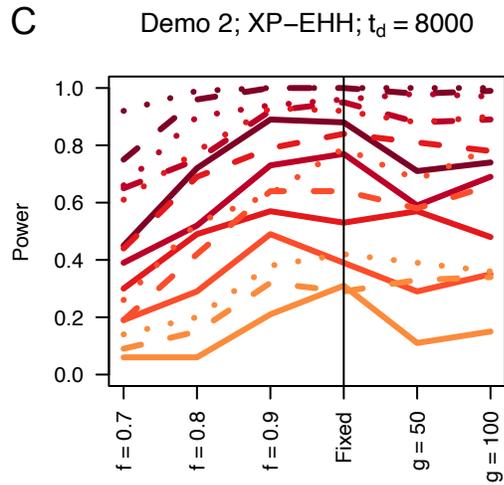
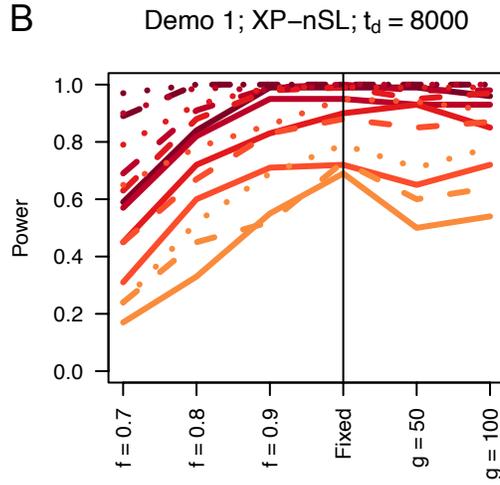
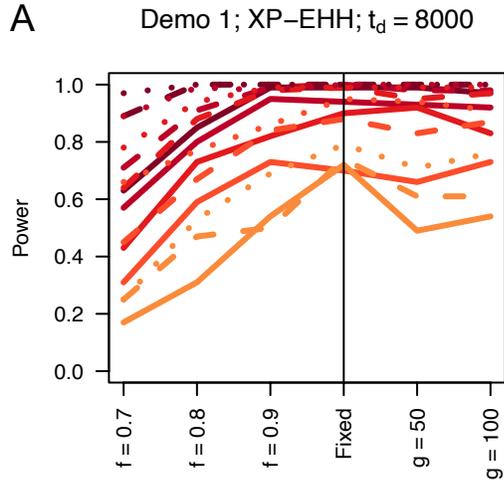
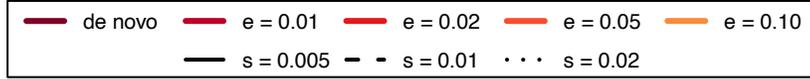
**E** Demo 3; XP-EHH;  $t_d = 4000$



**F** Demo 3; XP-nSL;  $t_d = 4000$

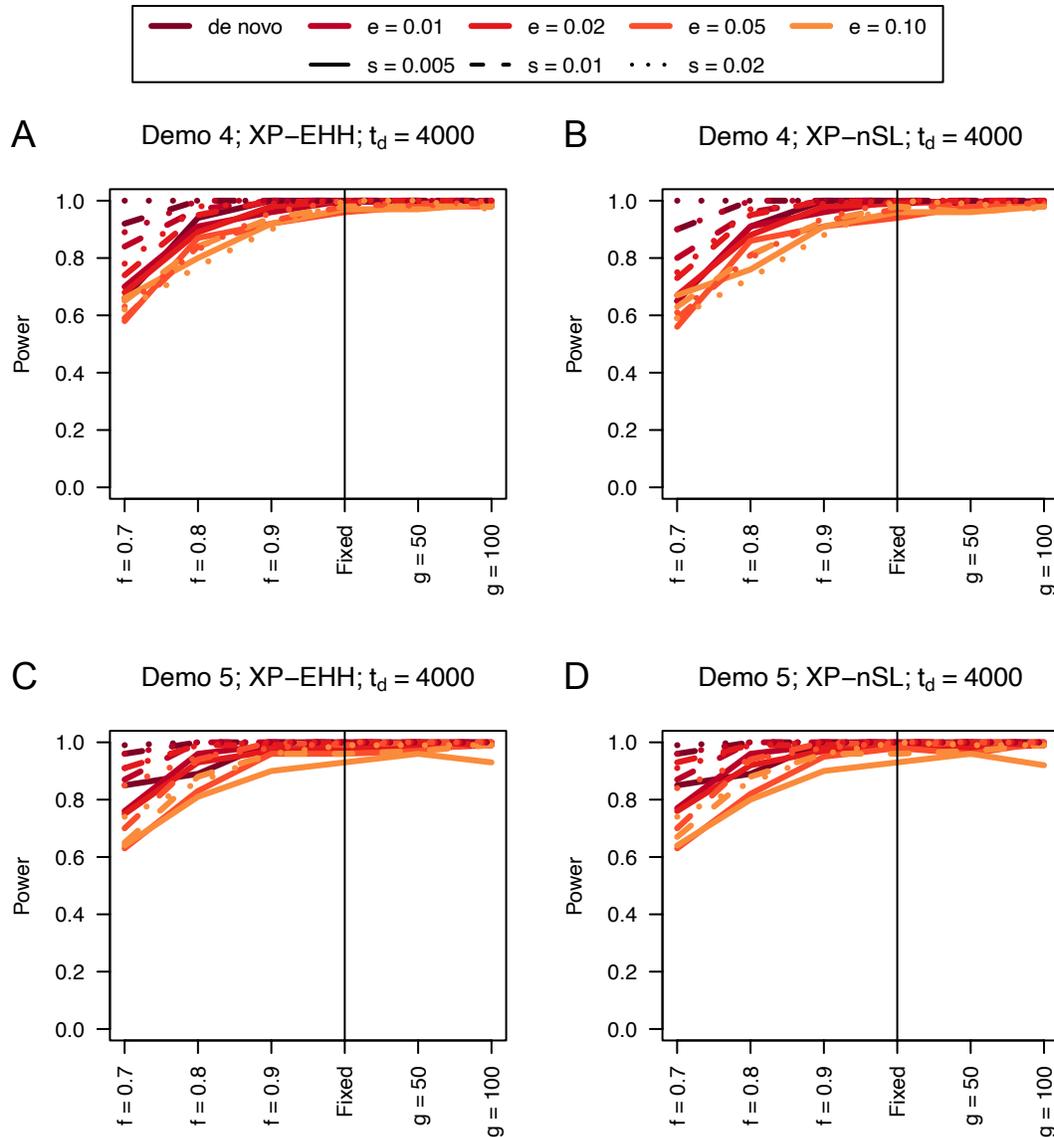


117 **Figure S9.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
118 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
119 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
120 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
121 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
122 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 100$  diploid samples from each population.  
123  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
124 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
125 4000 is the time in generations since the two populations diverged.



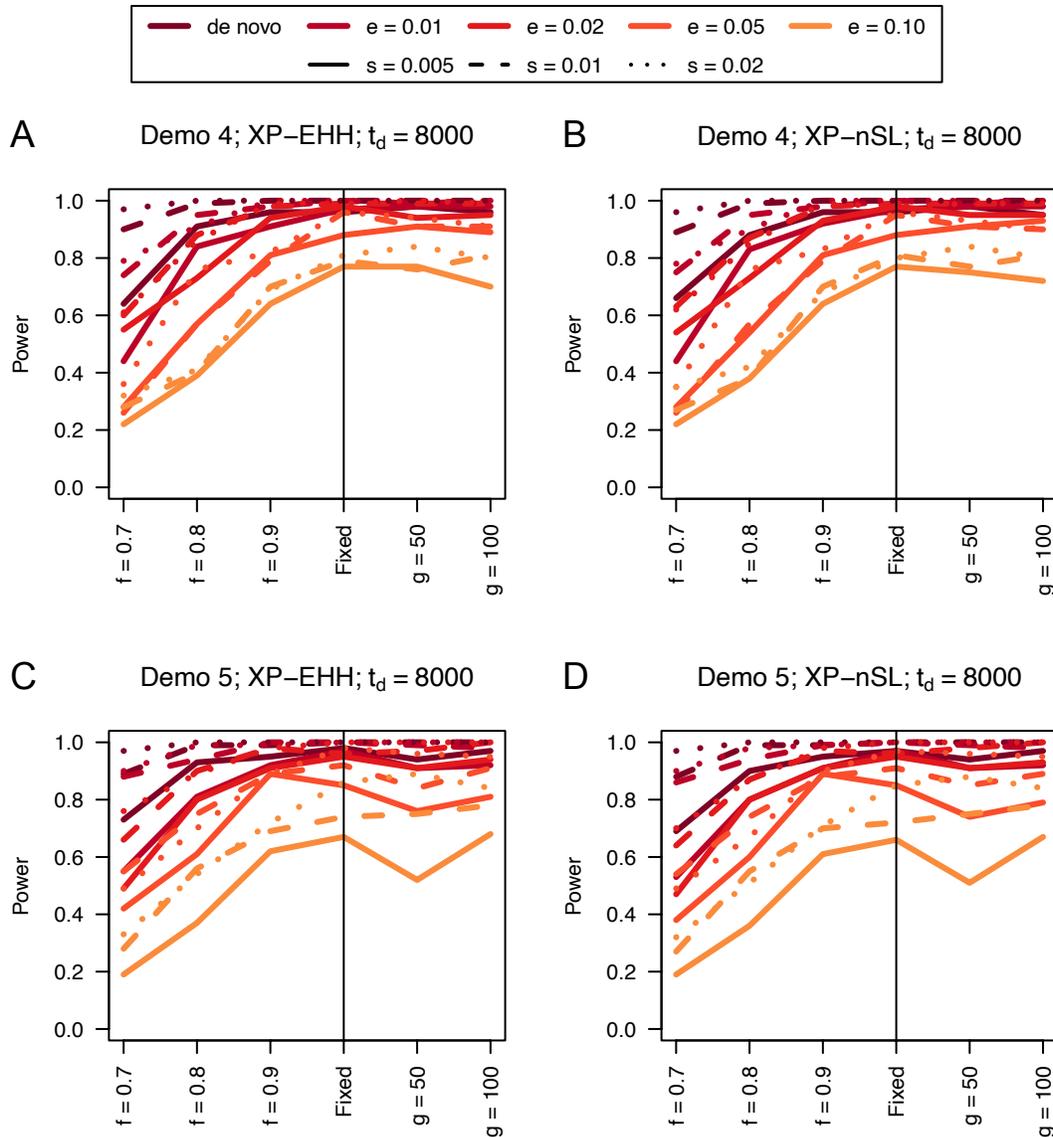
127 **Figure S10.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
128 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
129 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
130 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
131 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
132 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 100$  diploid samples from each population.  
133  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
134 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
135 8000 is the time in generations since the two populations diverged.

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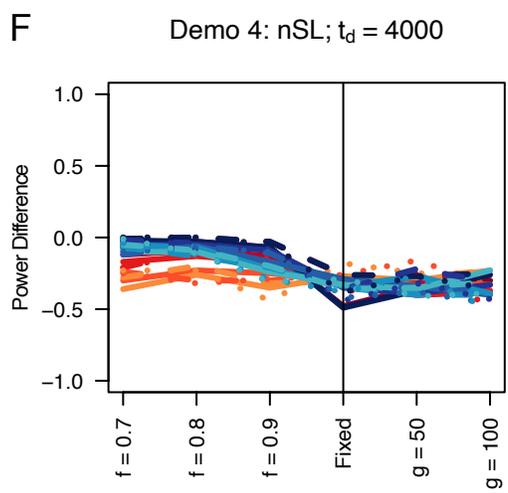
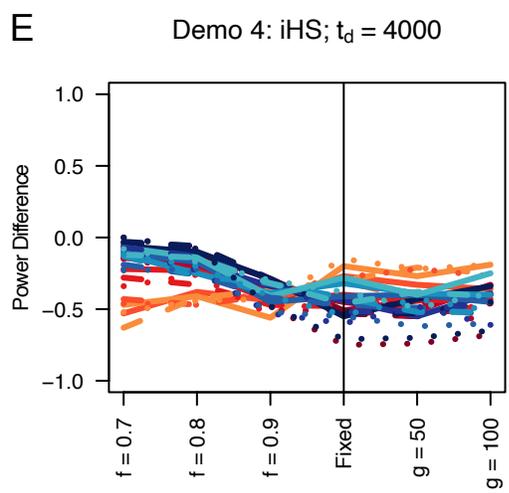
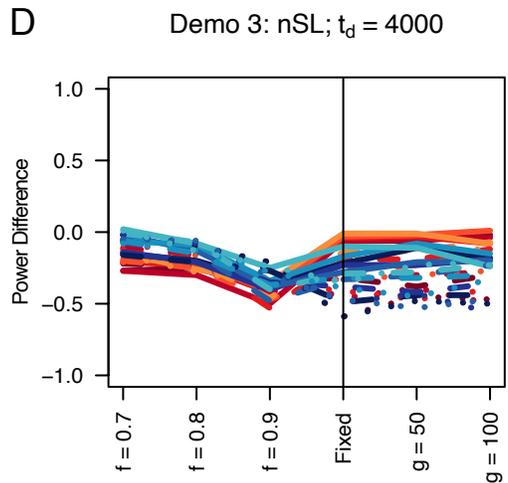
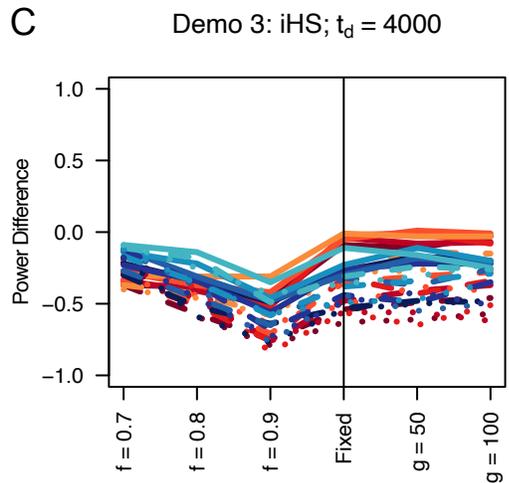
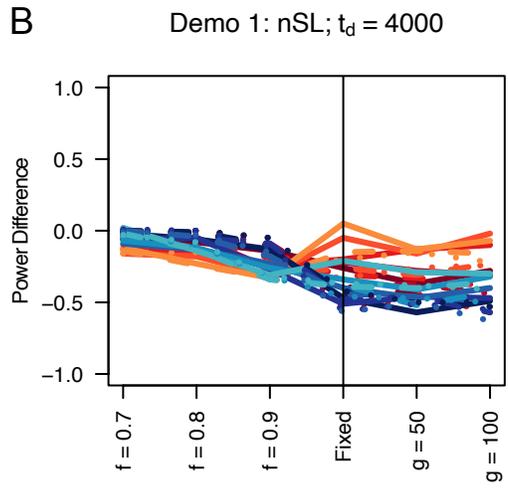
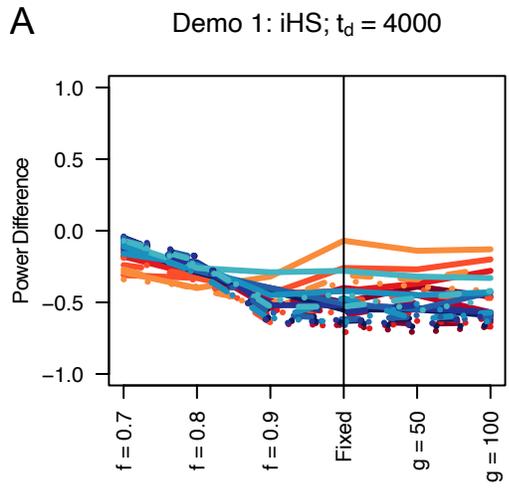
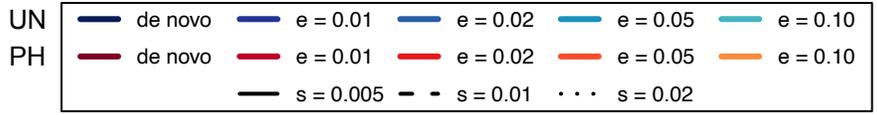


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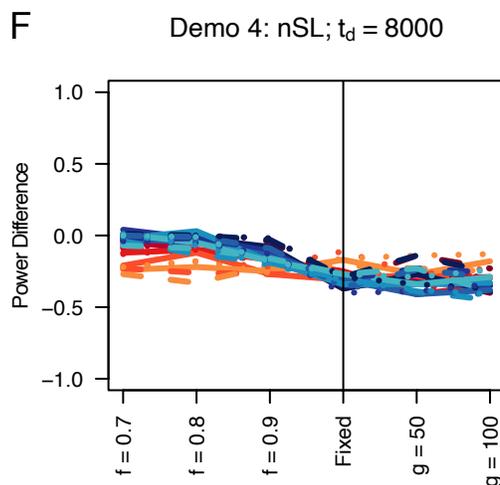
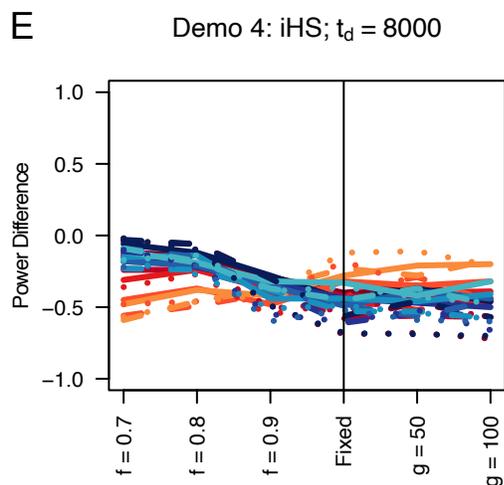
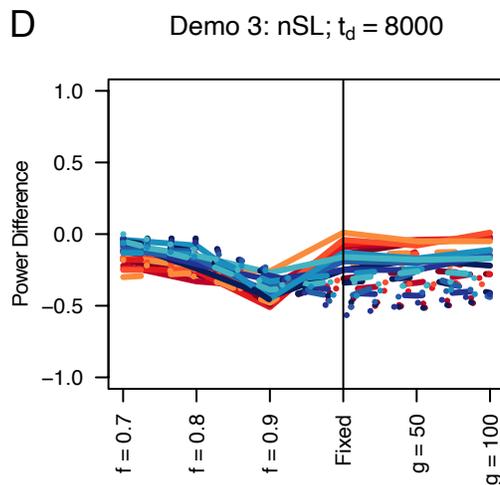
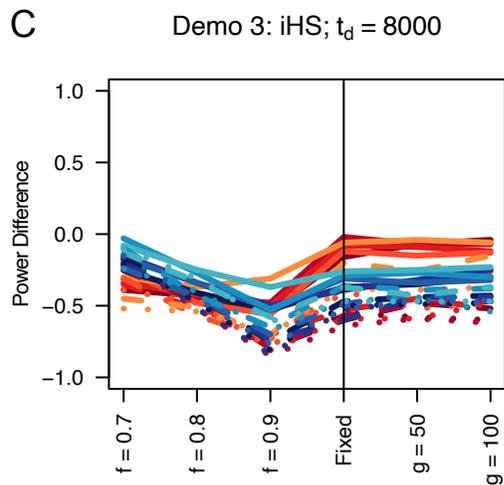
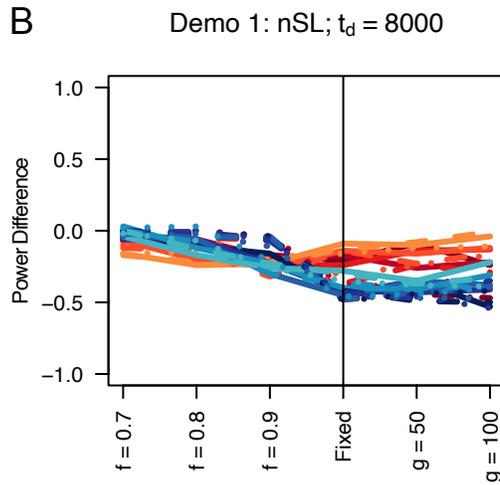
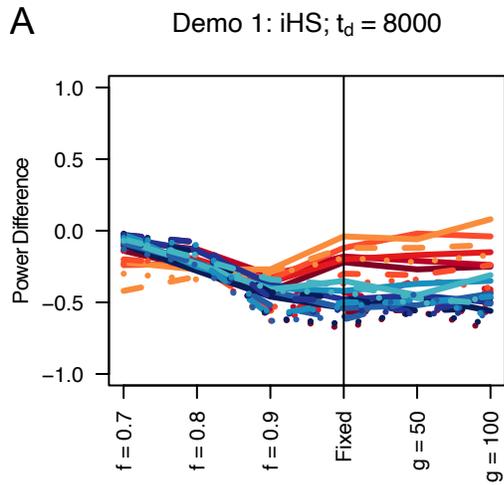
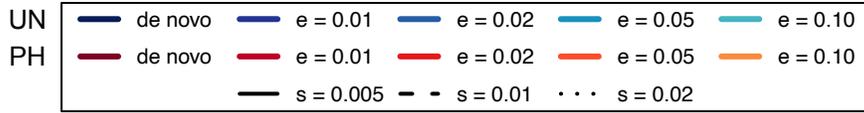
**Figure S11.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 100$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



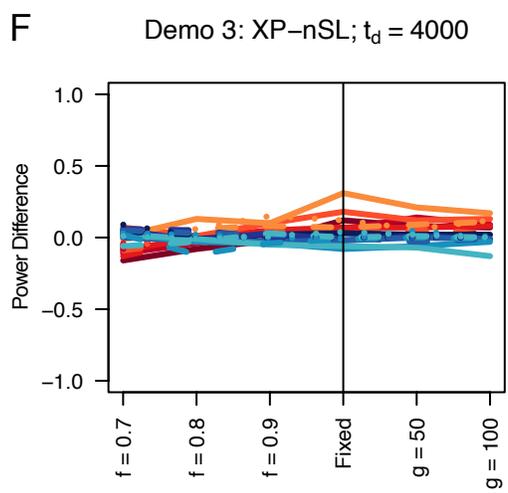
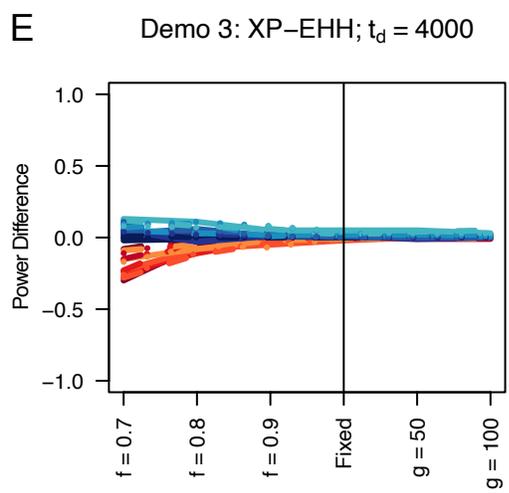
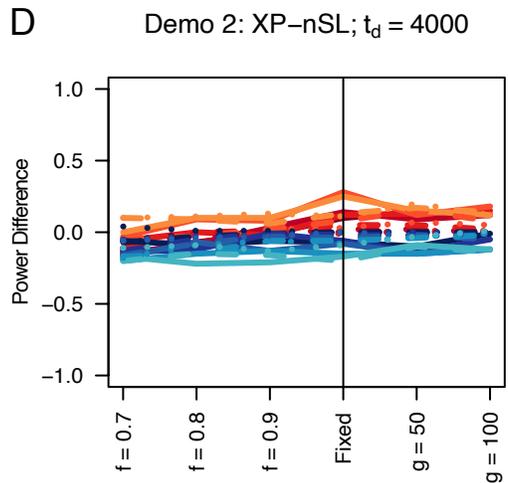
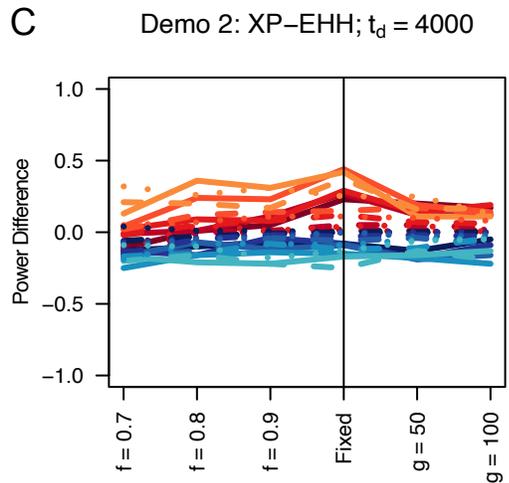
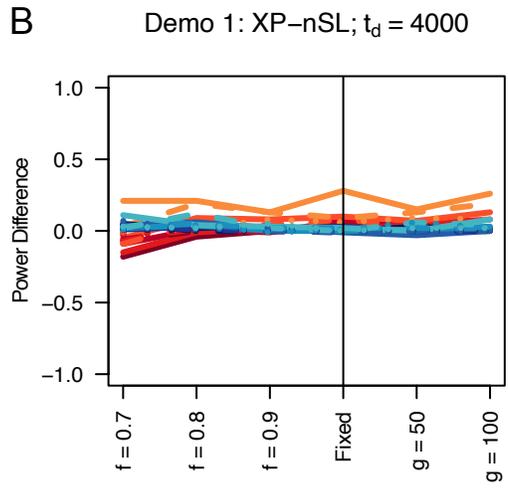
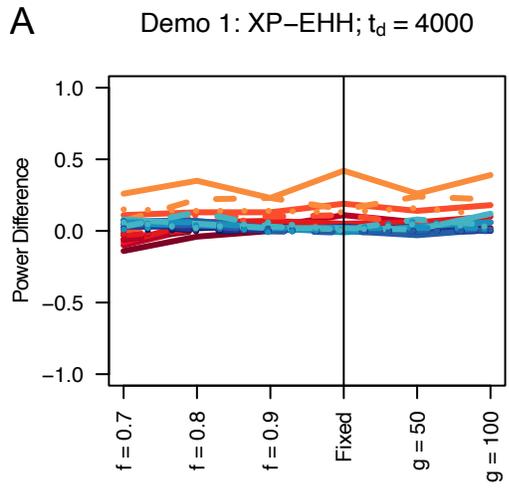
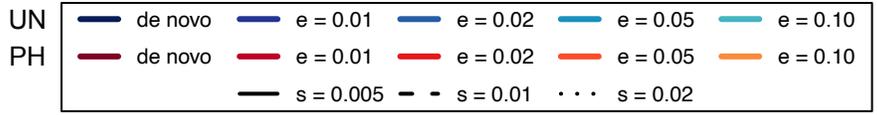
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 152 **Figure S12.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D)  
 153 under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 100$  diploid samples  
 154 from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
 155 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
 156 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



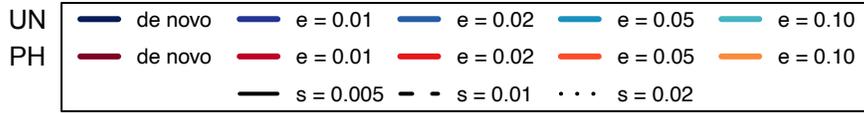
158 **Figure S13.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
159 and F) and phased implementations. Blue curves represent the power difference between the unphased  
160 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
161 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
162 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
163 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$  diploid samples.  $s$  is the selection coefficient,  
164  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
165 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
166 generations since the two populations diverged.



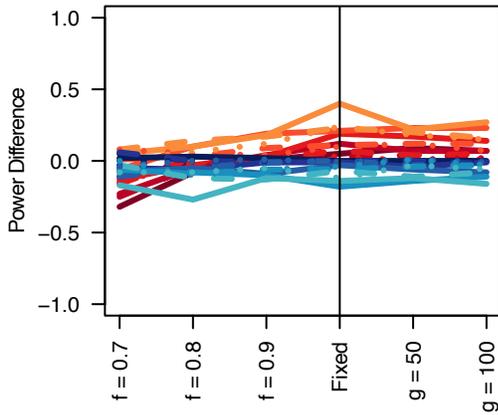
168 **Figure S14.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
169 and F) and phased implementations. Blue curves represent the power difference between the unphased  
170 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
171 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
172 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
173 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 100$  diploid samples.  $s$  is the selection coefficient,  
174  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
175 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in  
176 generations since the two populations diverged.



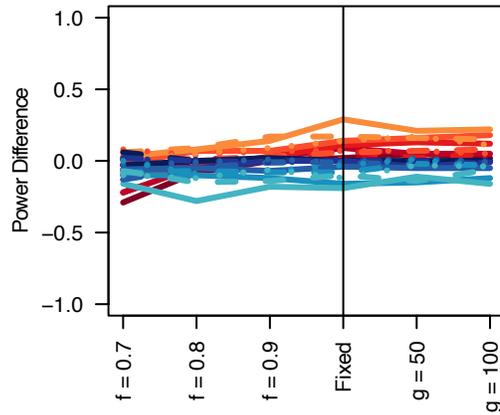
178 **Figure S15.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
179 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
180 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
181 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
182 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
183 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 100$  diploid samples from each population.  
184  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
185 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
186 4000 is the time in generations since the two populations diverged.



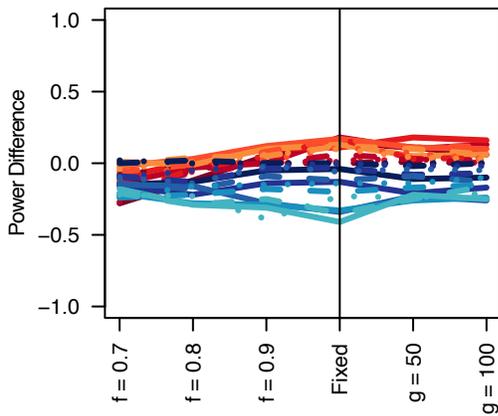
**A** Demo 1: XP-EHH;  $t_d = 8000$



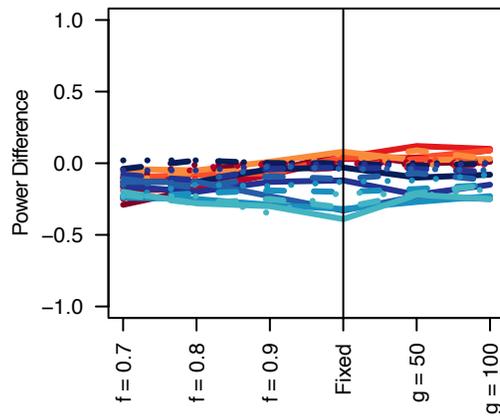
**B** Demo 1: XP-nSL;  $t_d = 8000$



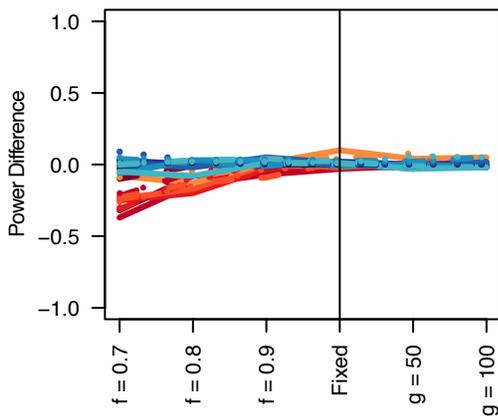
**C** Demo 2: XP-EHH;  $t_d = 8000$



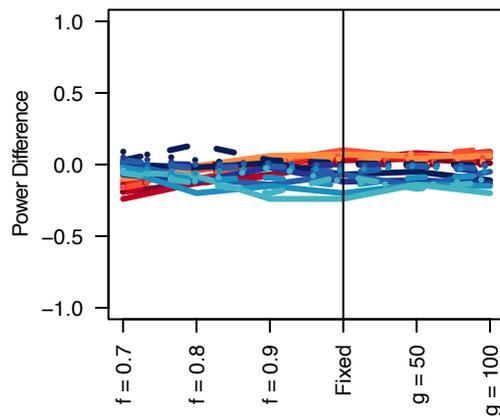
**D** Demo 2: XP-nSL;  $t_d = 8000$



**E** Demo 3: XP-EHH;  $t_d = 8000$

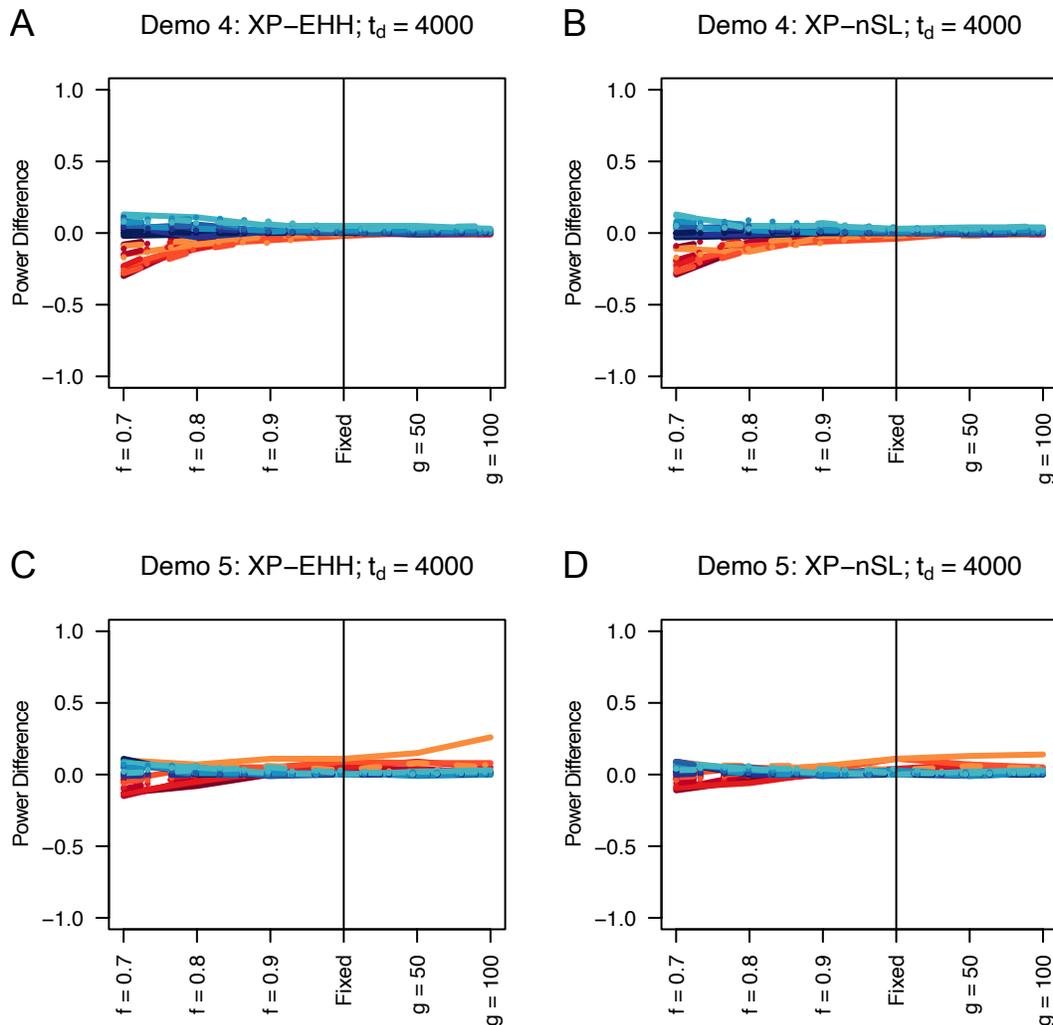
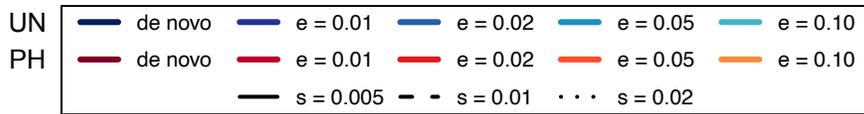


**F** Demo 3: XP-nSL;  $t_d = 8000$

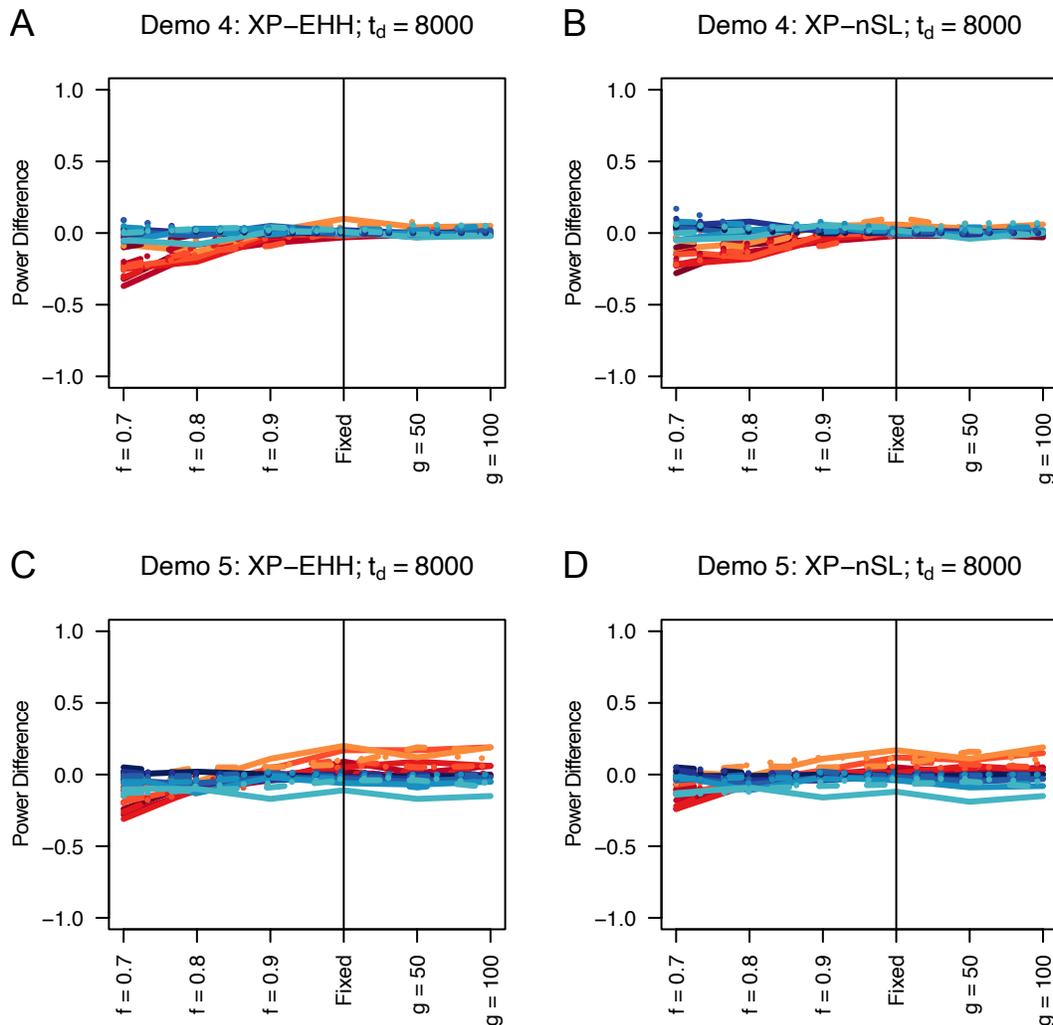
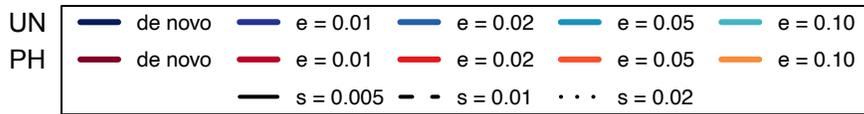


188 **Figure S16.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
189 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
190 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
191 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
192 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
193 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 100$  diploid samples from each population.  
194  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
195 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
196 8000 is the time in generations since the two populations diverged.

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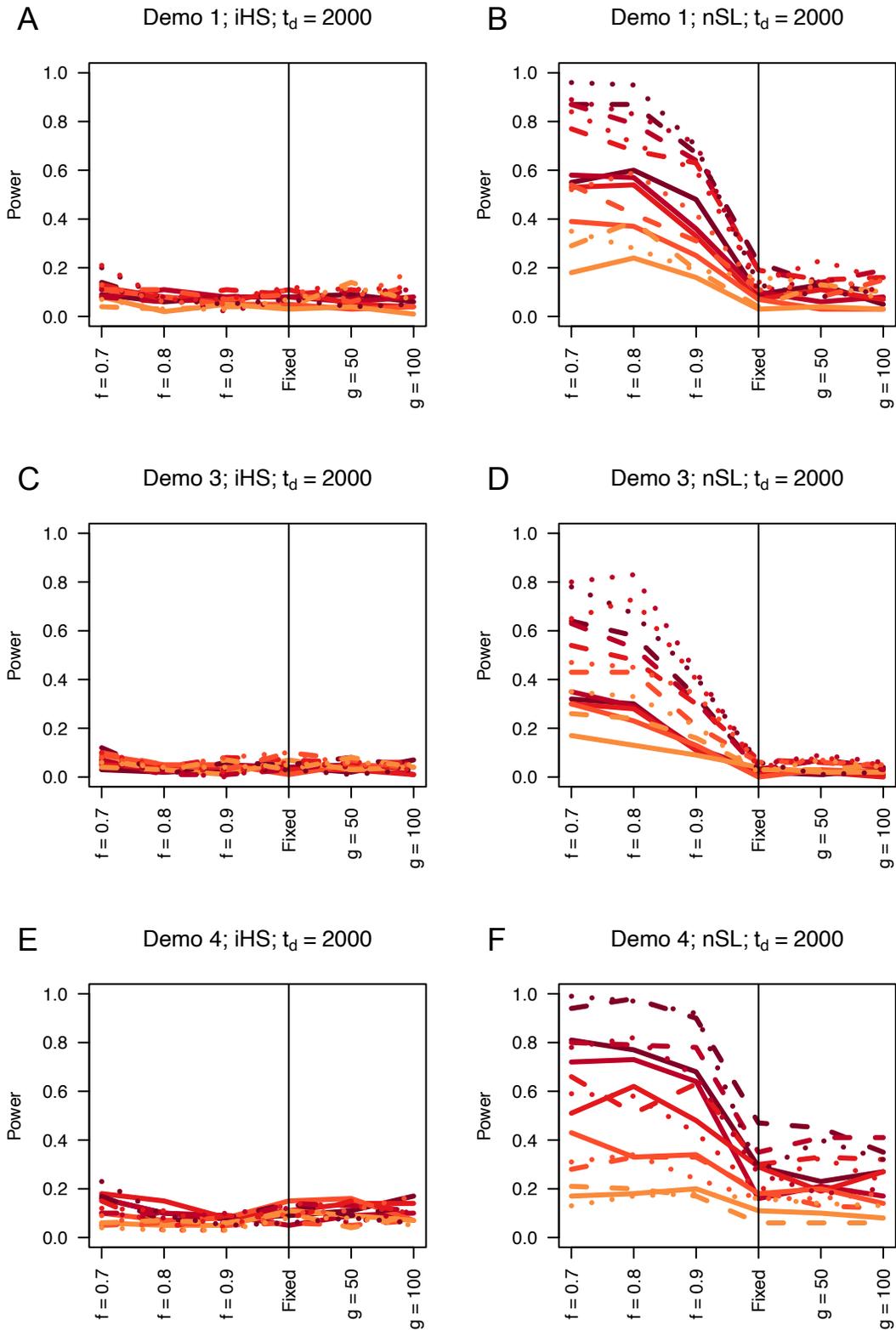
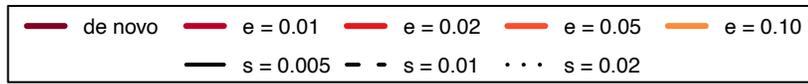


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 206 **Figure S17.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B  
 207 and D) and phased implementations. Blue curves represent the power difference between the unphased  
 208 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
 209 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
 210 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and  
 211 B), and Demo 5 (C and D) with  $n = 100$  diploid samples from each population.  $s$  is the selection  
 212 coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations  
 213 at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
 214 generations since the two populations diverged.

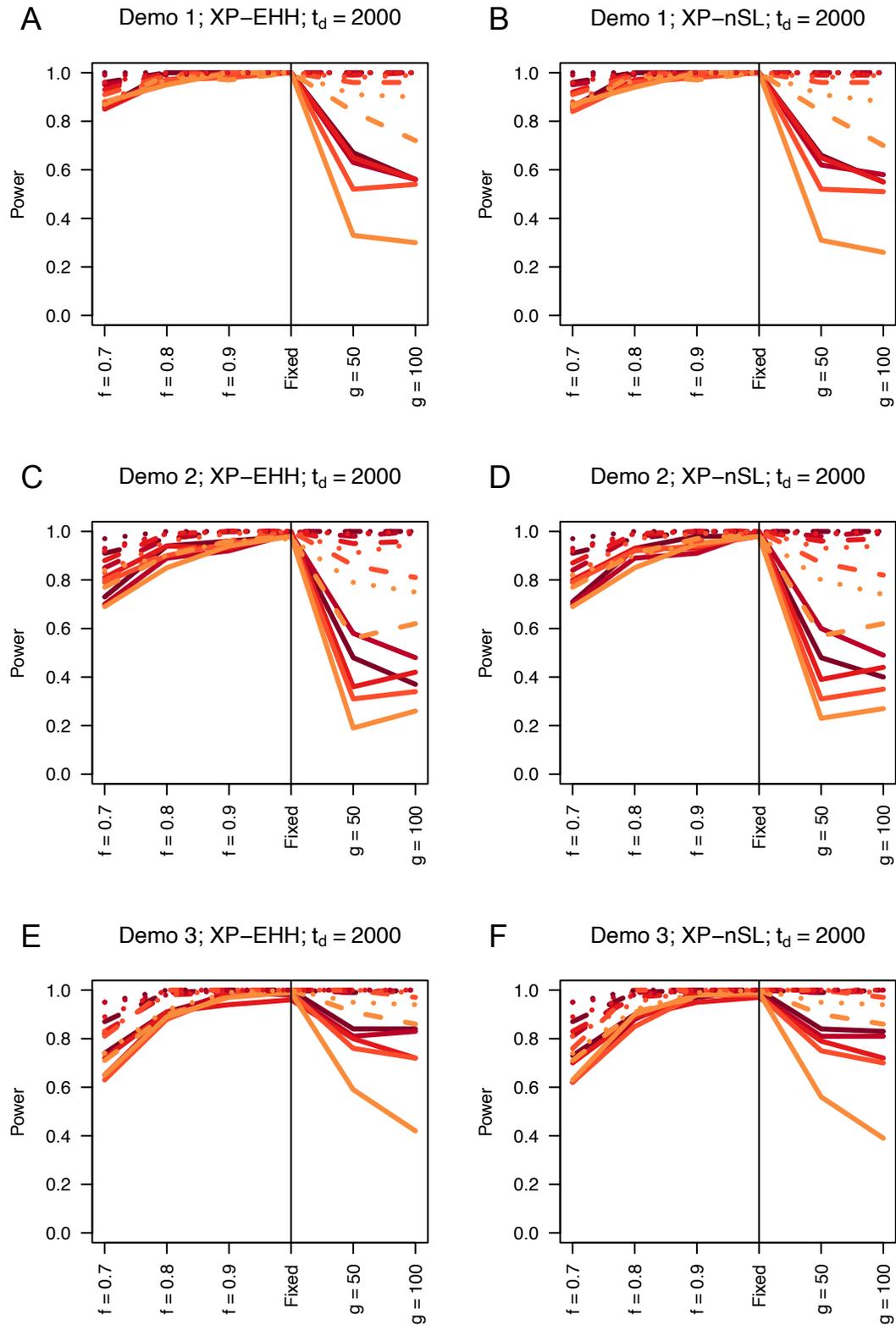
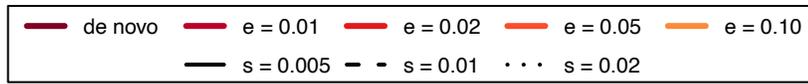


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**Table S18.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 100$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



226 **Figure S19.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
227 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$   
228 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
229 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
230 selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



232 **Figure S20.** Power curves for unphased implementations of XP-EHH (A, C, and E) and XP-nSL (B, D,  
233 and F) under demographic histories Demo 1 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n$   
234 = 50 diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the  
235 adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is  
236 the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two  
237 populations diverged.

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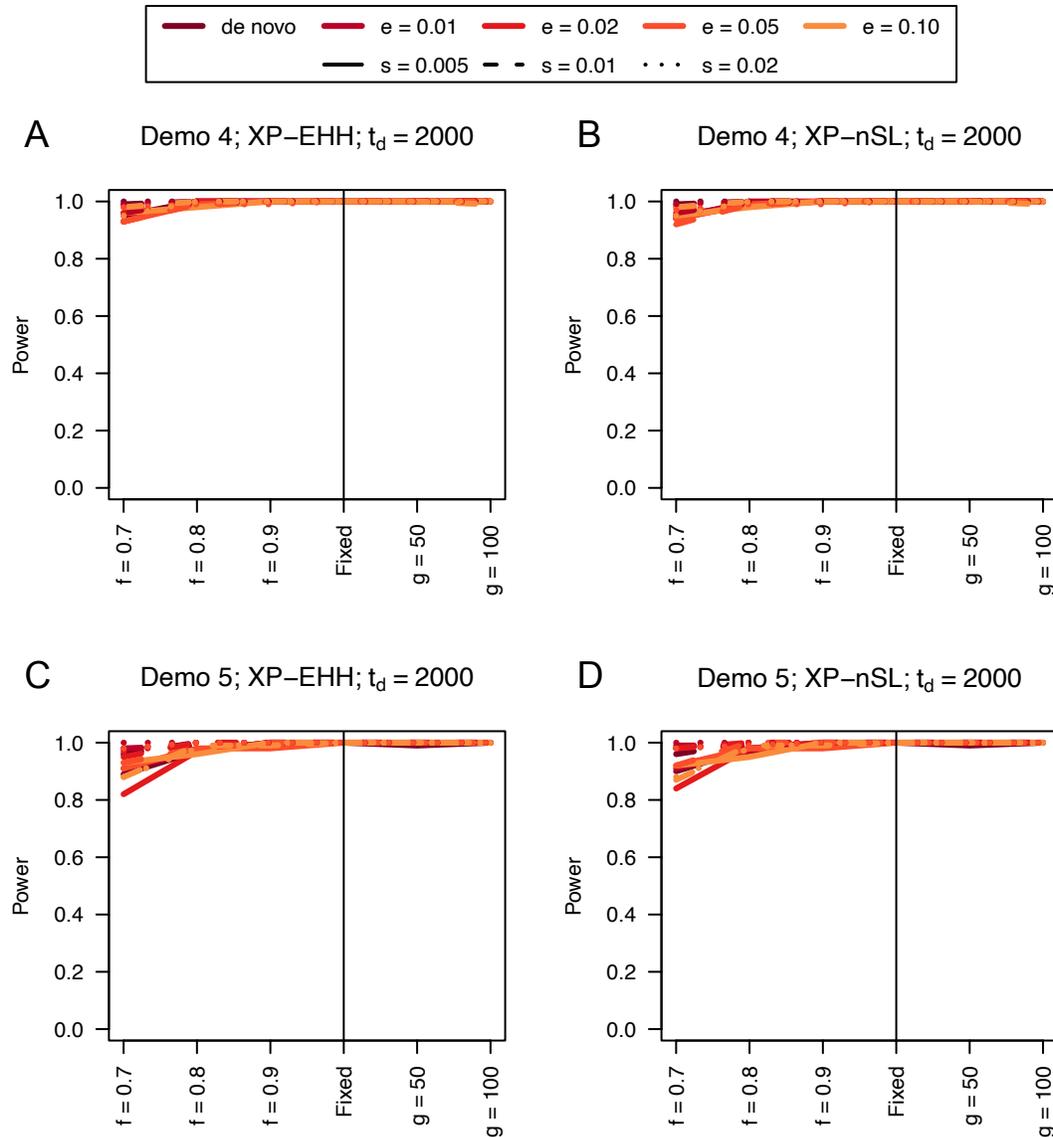
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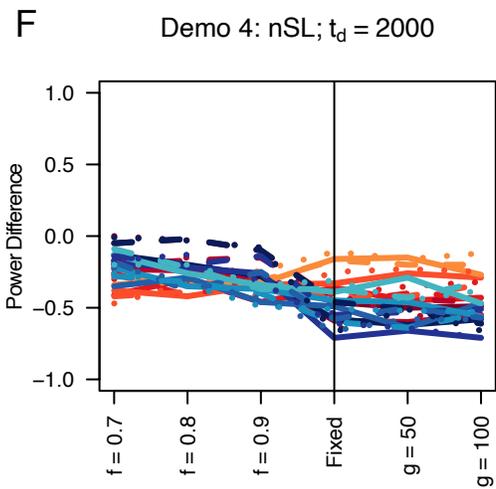
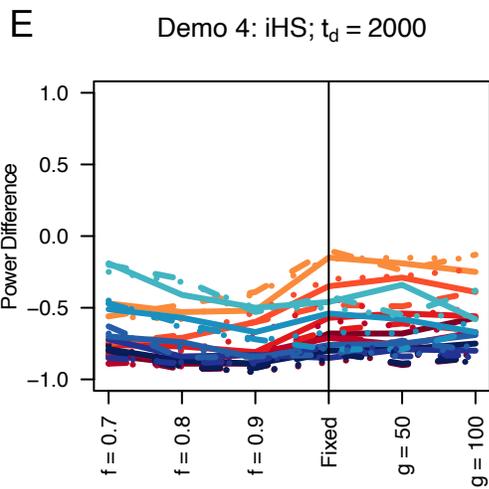
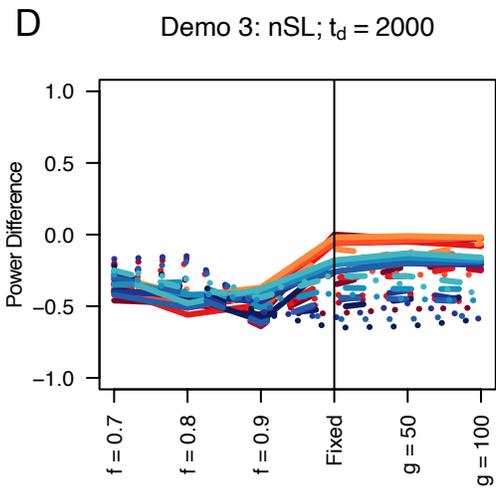
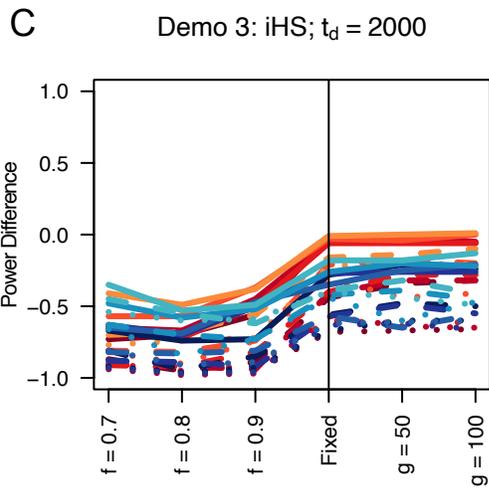
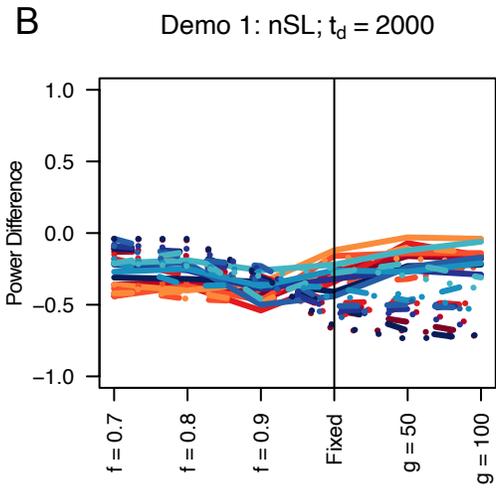
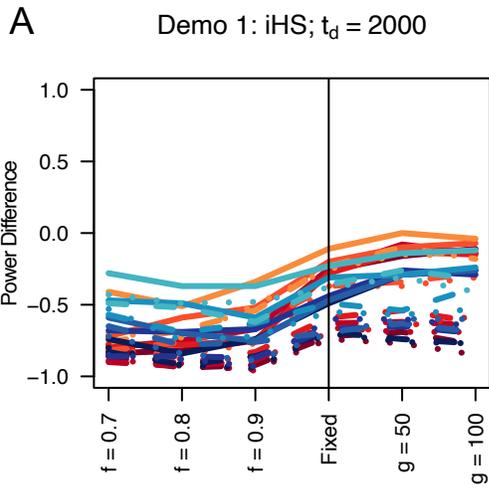
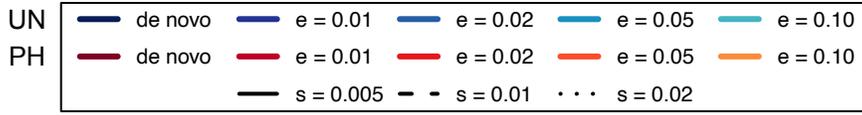
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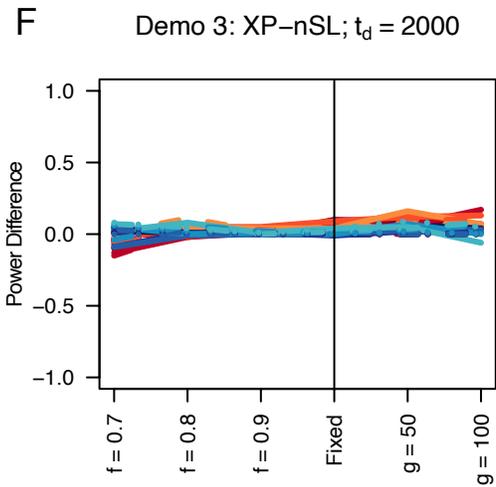
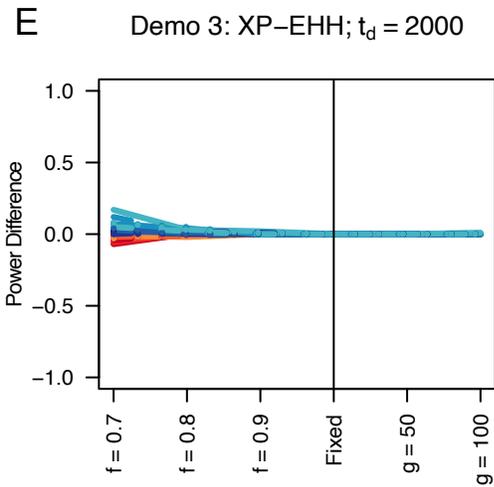
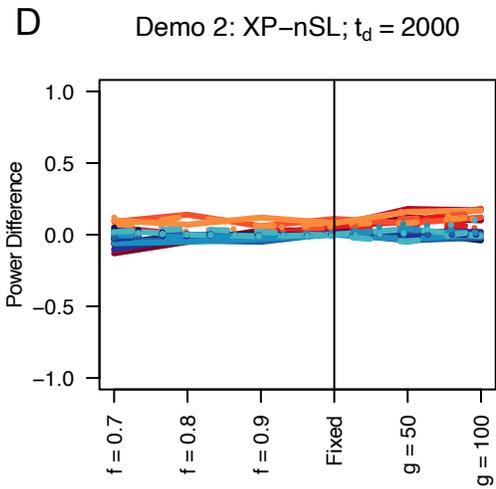
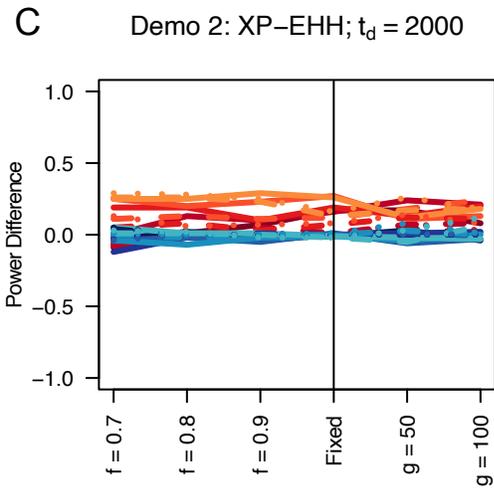
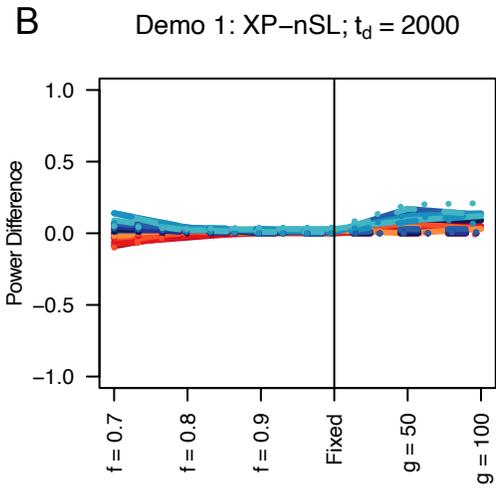
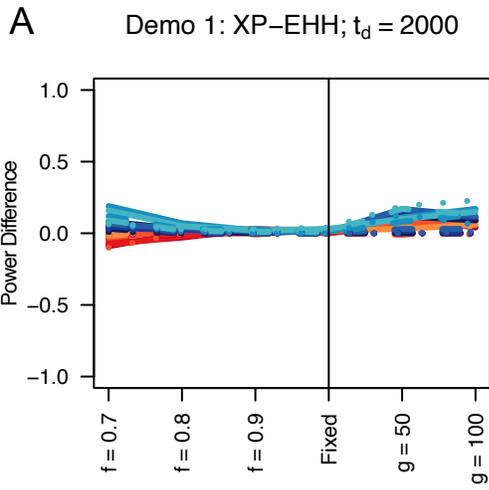
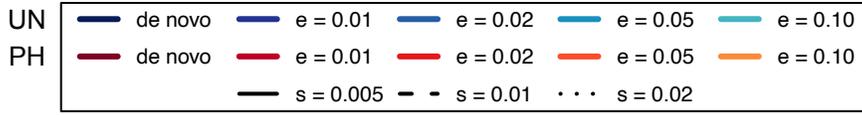


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**Figure S21.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.

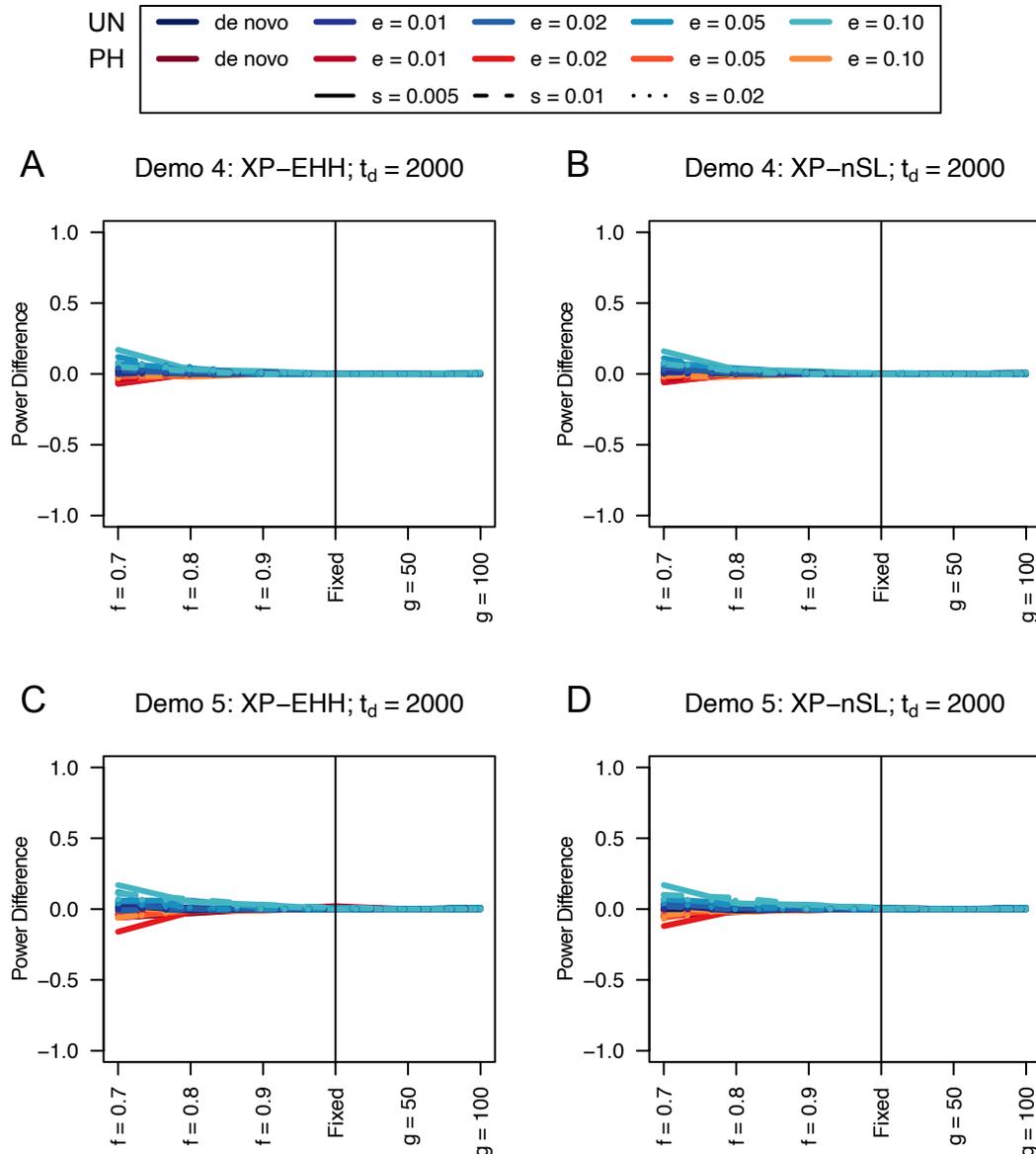


257 **Figure S22.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
258 and F) and phased implementations. Blue curves represent the power difference between the unphased  
259 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
260 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
261 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
262 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$  diploid samples.  $s$  is the selection coefficient,  $f$   
263 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
264 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
265 generations since the two populations diverged.



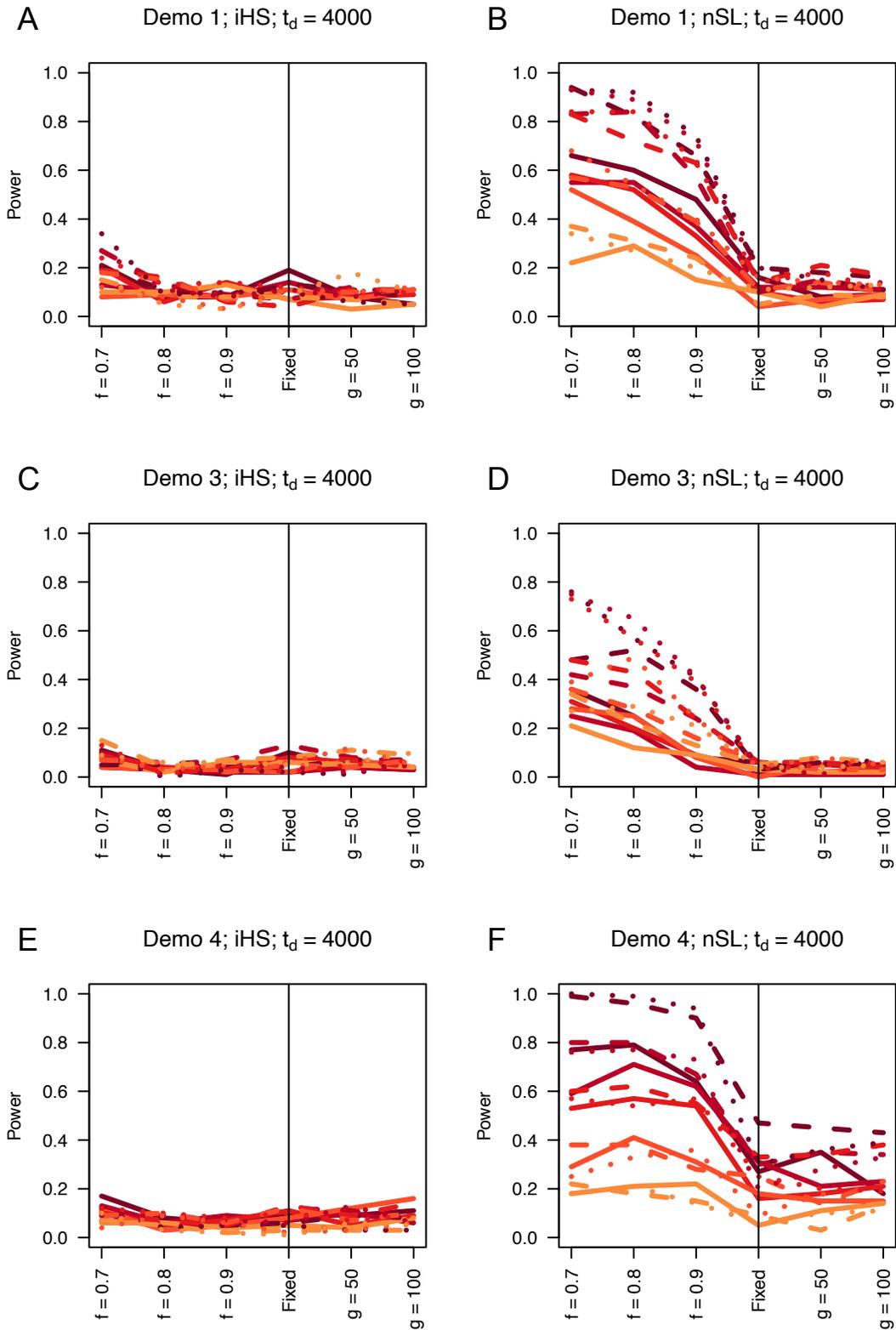
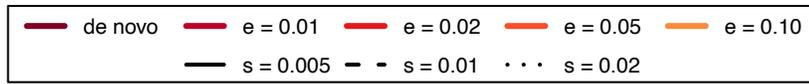
267 **Figure S23.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
268 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
269 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
270 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
271 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
272 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 50$  diploid samples from each population.  $s$   
273 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
274 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
275 2000 is the time in generations since the two populations diverged.

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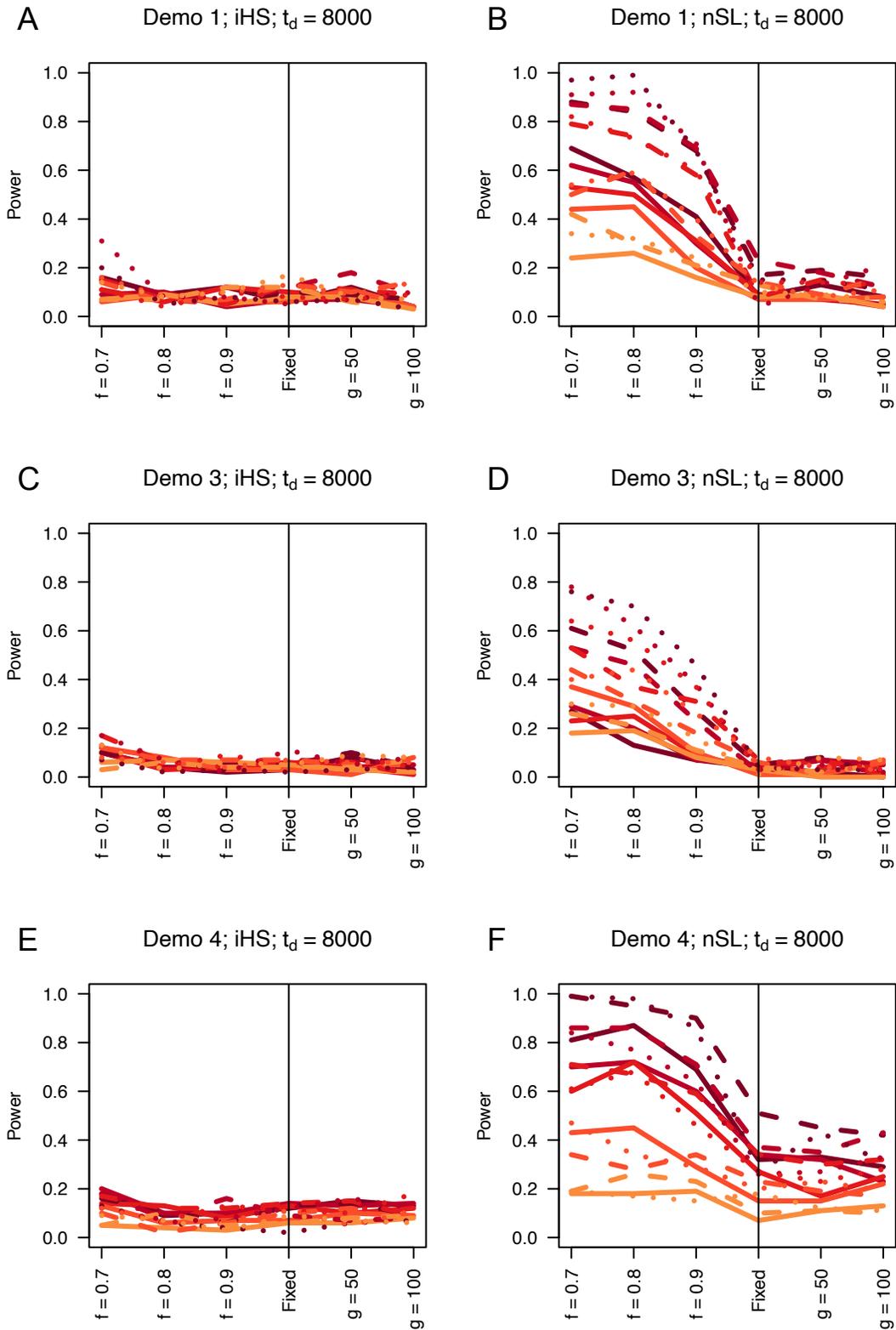
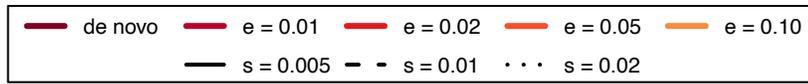


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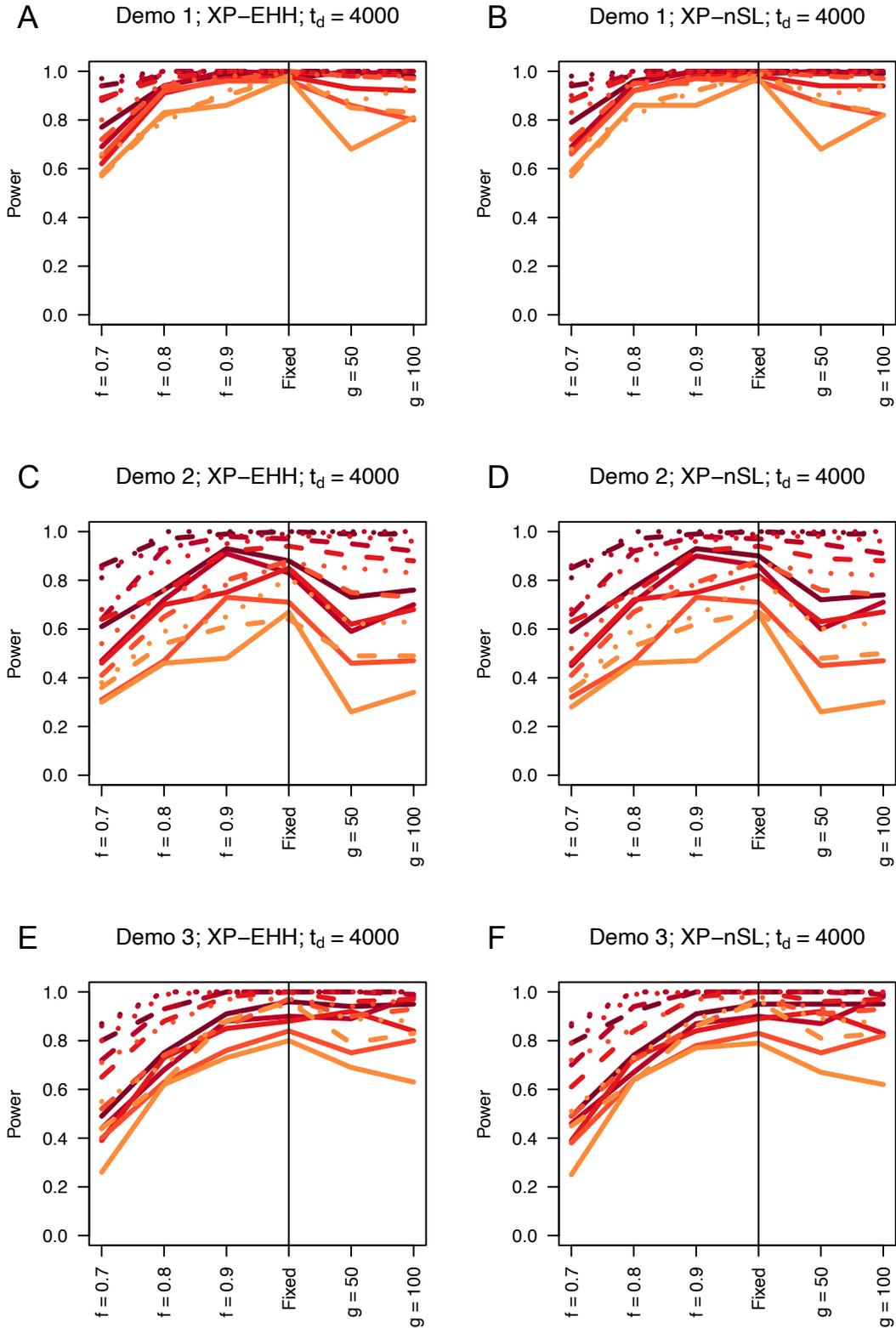
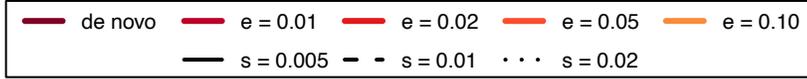
**Figure S24.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



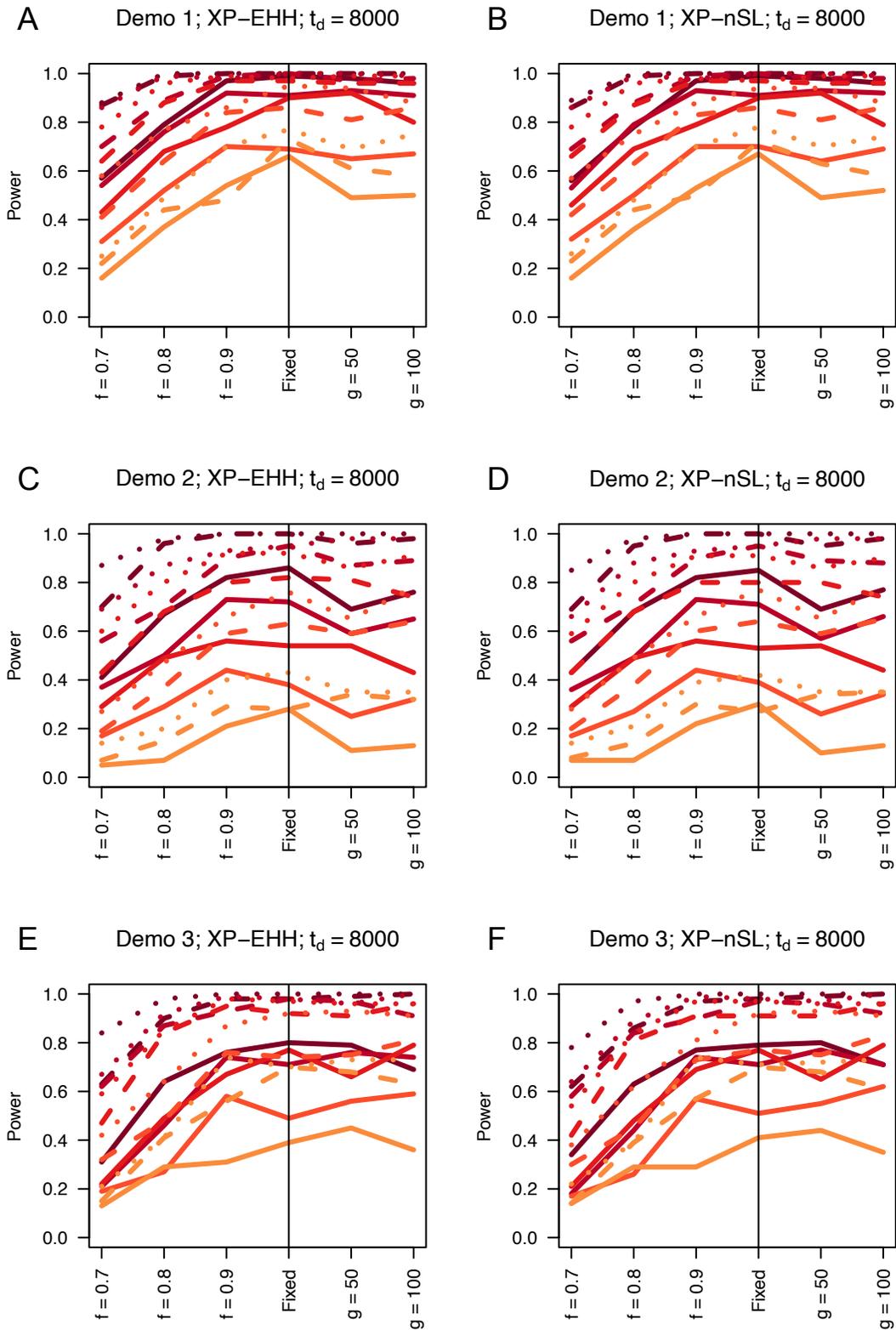
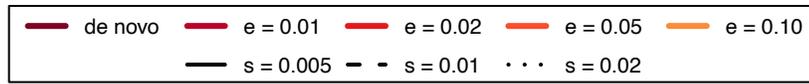
295 **Figure S25.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
296 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$   
297 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
298 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
299 selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



301 **Figure S26.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
302 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$   
303 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
304 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
305 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.

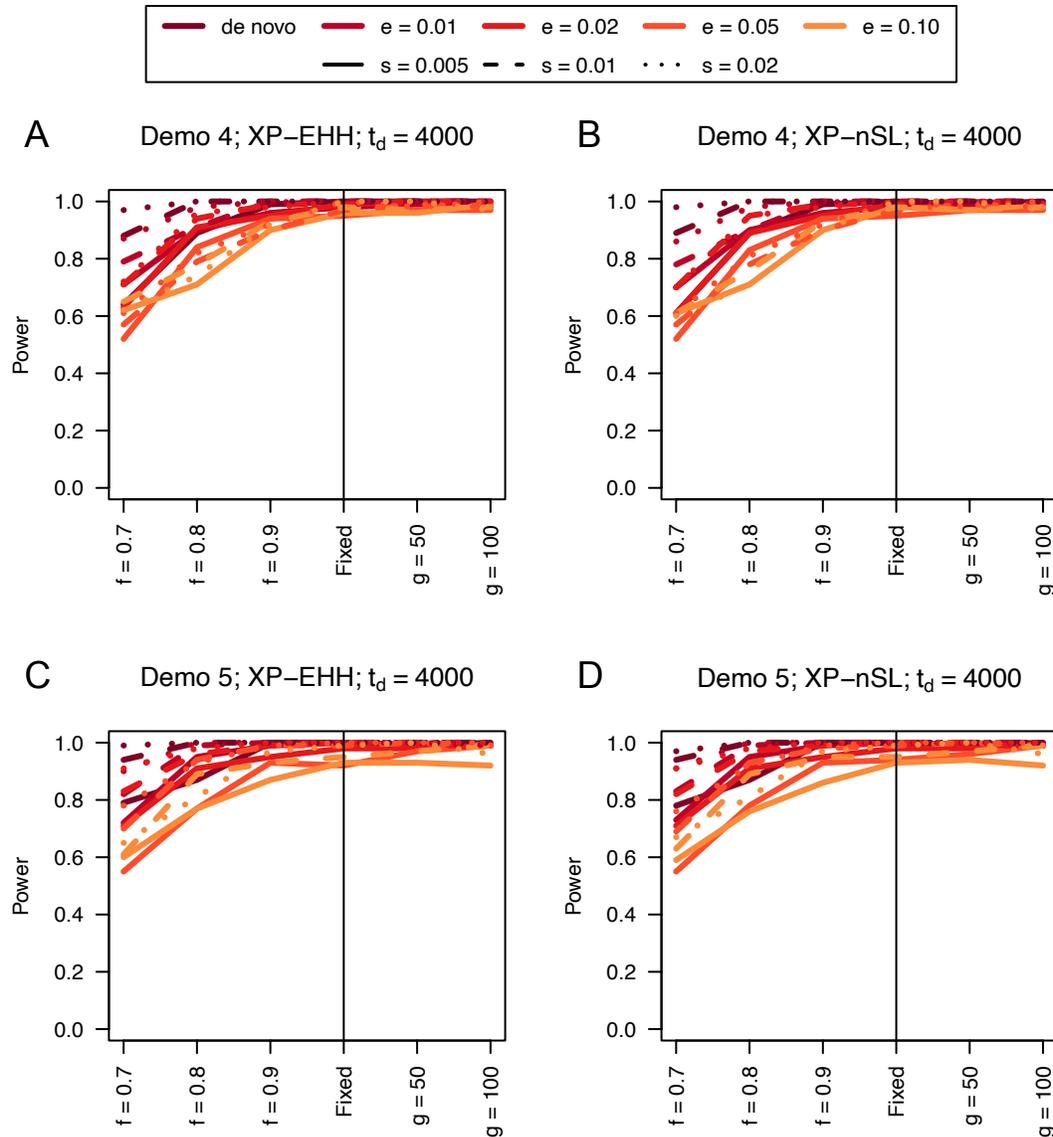


307 **Figure S27.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
308 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
309 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
310 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
311 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
312 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 50$  diploid samples from each population.  $s$   
313 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
314 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
315 4000 is the time in generations since the two populations diverged.



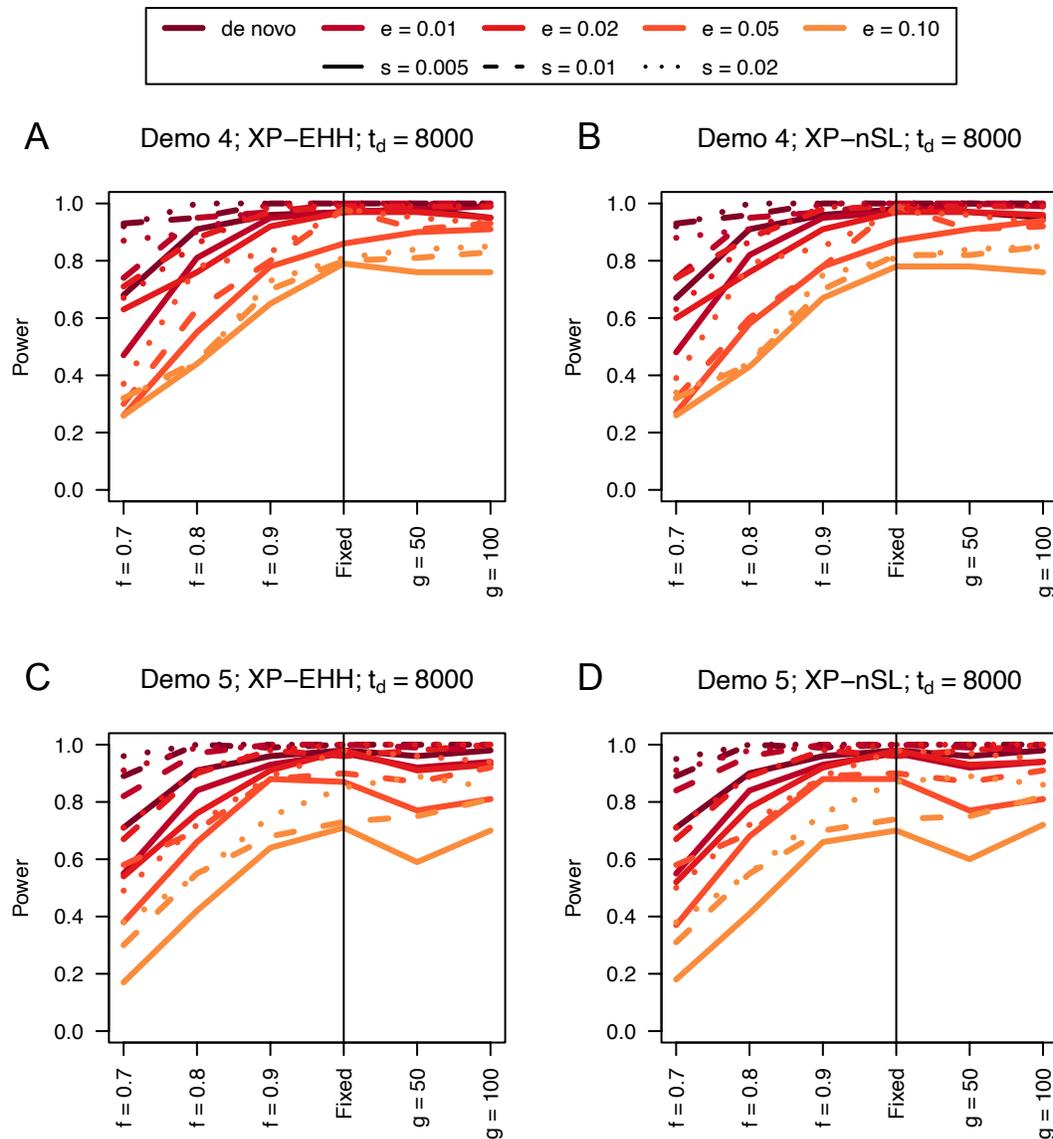
317 **Figure S28.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
318 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
319 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
320 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
321 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
322 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 50$  diploid samples from each population.  $s$   
323 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
324 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
325 8000 is the time in generations since the two populations diverged.

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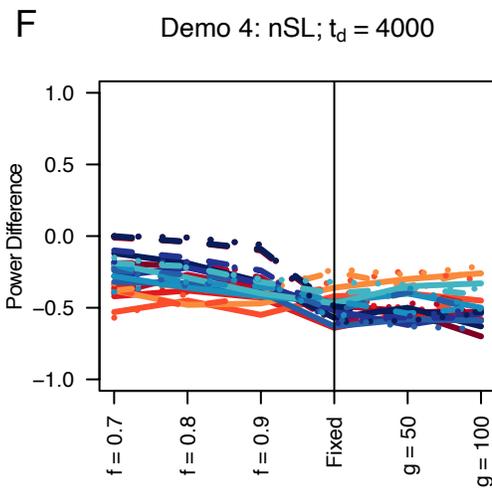
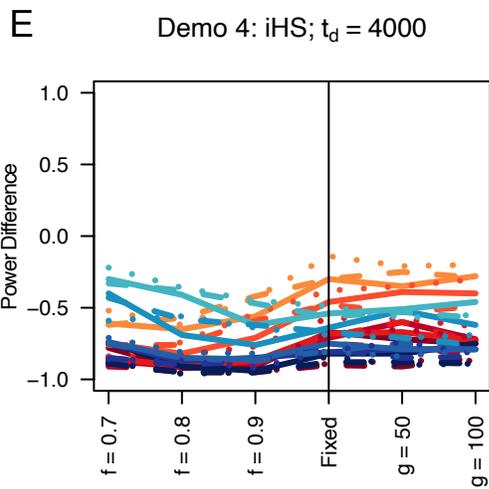
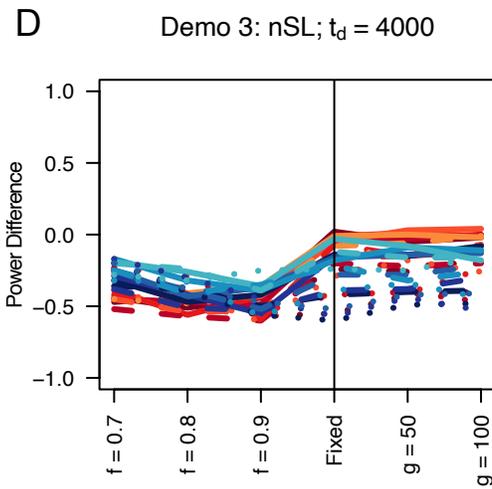
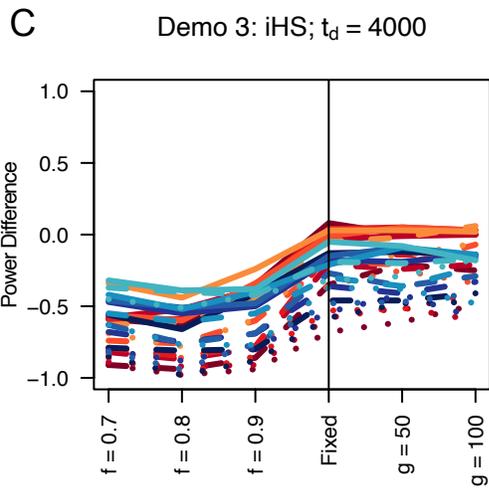
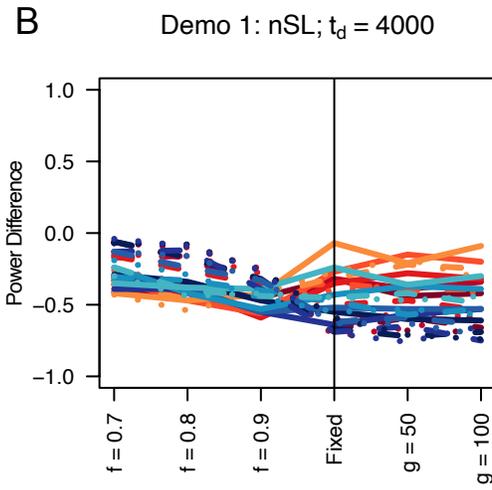
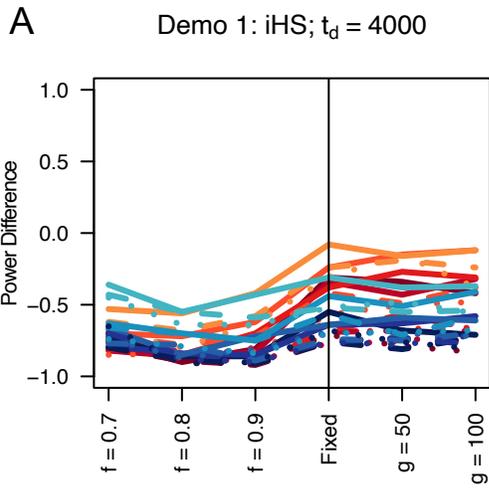
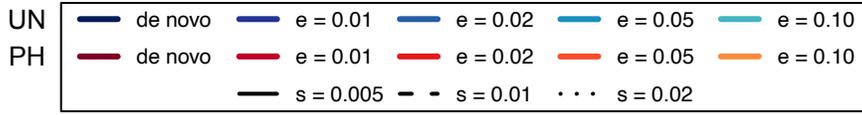


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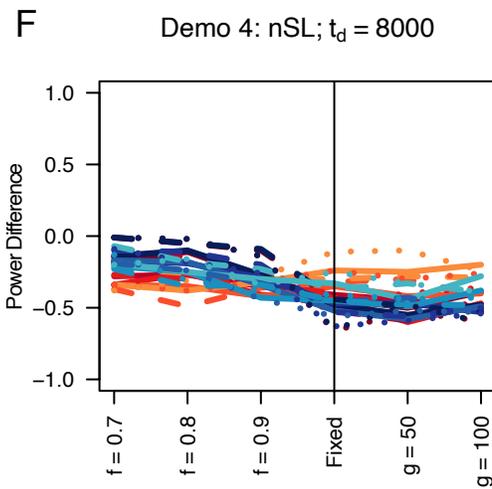
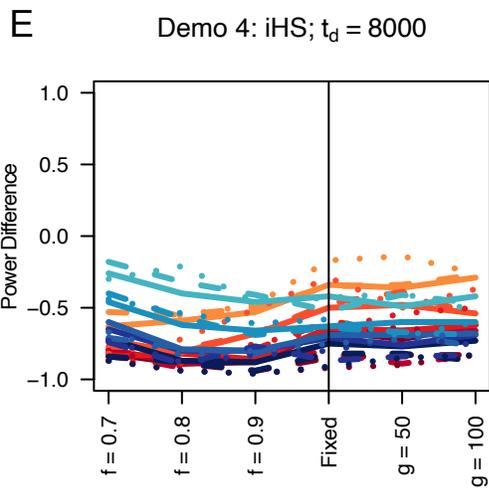
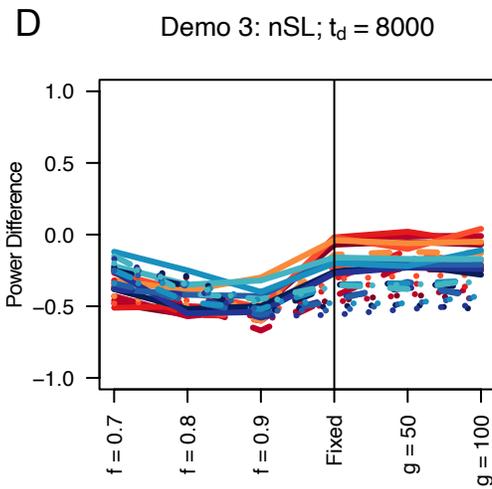
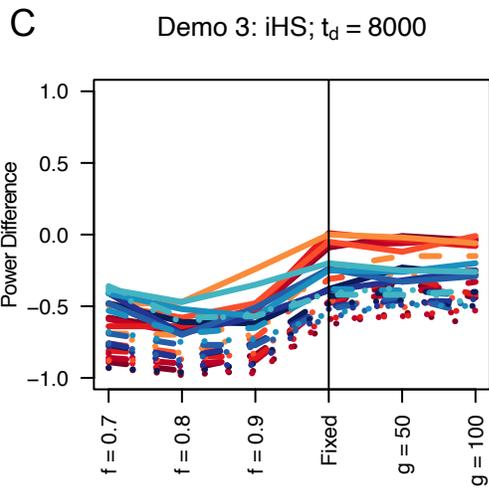
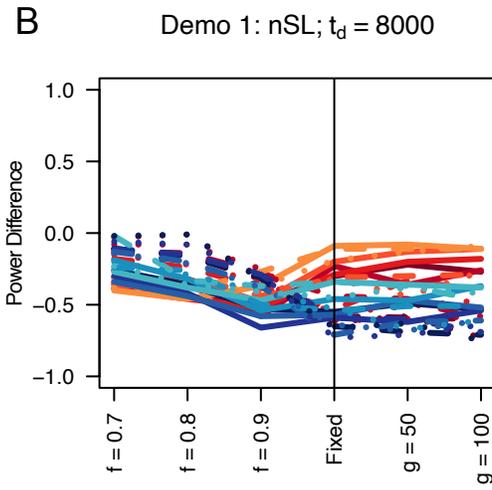
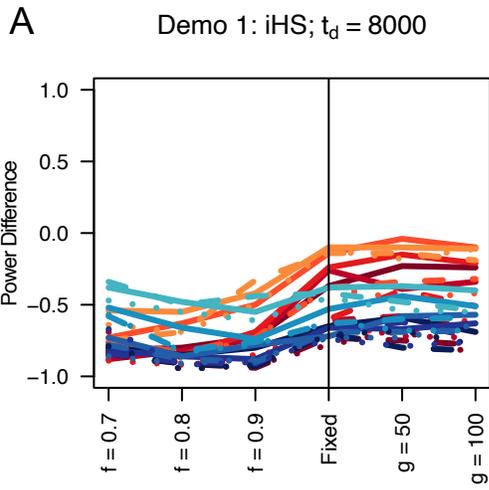
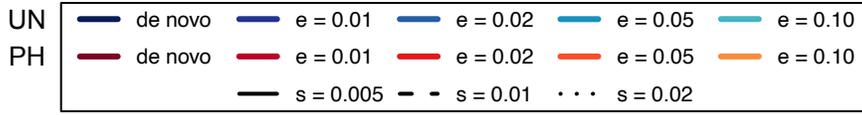
**Figure S29.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



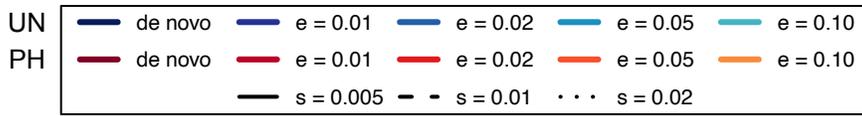
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 342 **Figure S30.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D)  
 343 under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from  
 344 each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
 345 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
 346 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



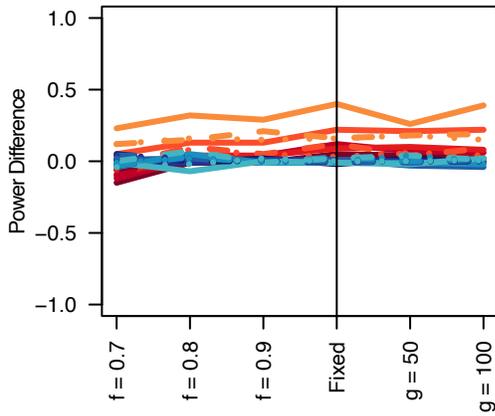
348 **Figure S31.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
349 and F) and phased implementations. Blue curves represent the power difference between the unphased  
350 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
351 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
352 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
353 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$  diploid samples.  $s$  is the selection coefficient,  $f$   
354 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
355 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
356 generations since the two populations diverged.



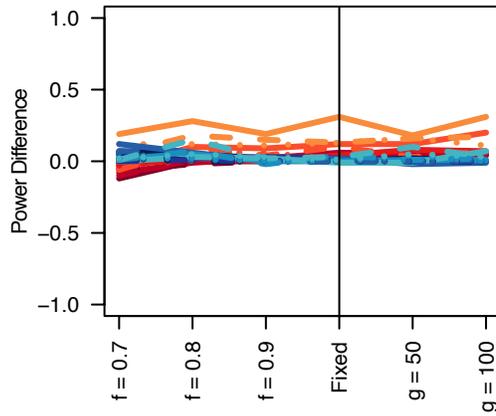
358 **Figure S32.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
359 and F) and phased implementations. Blue curves represent the power difference between the unphased  
360 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
361 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
362 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
363 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 50$  diploid samples.  $s$  is the selection coefficient,  $f$   
364 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
365 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in  
366 generations since the two populations diverged.



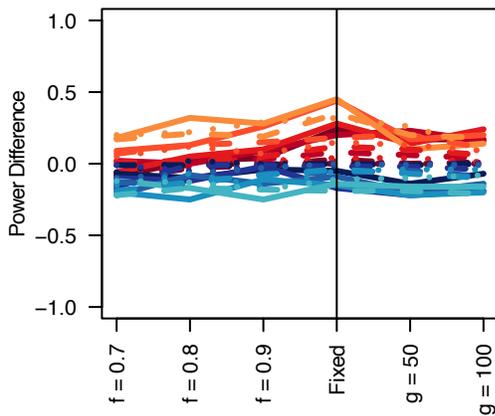
**A** Demo 1: XP-EHH;  $t_d = 4000$



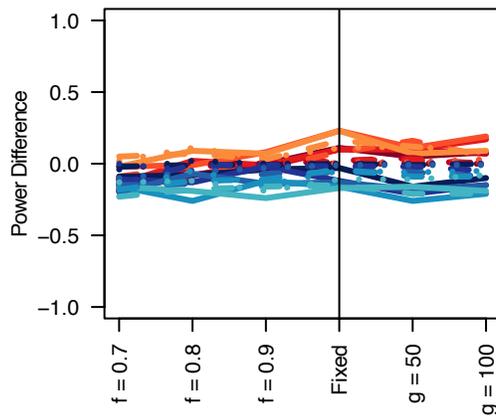
**B** Demo 1: XP-nSL;  $t_d = 4000$



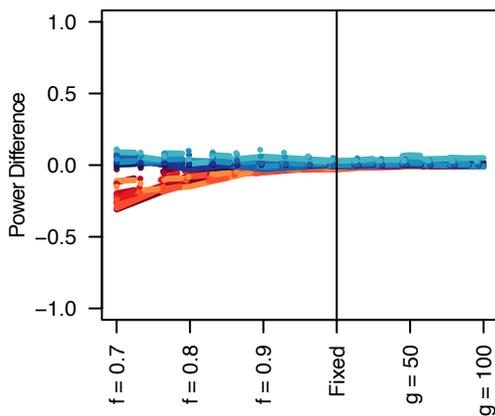
**C** Demo 2: XP-EHH;  $t_d = 4000$



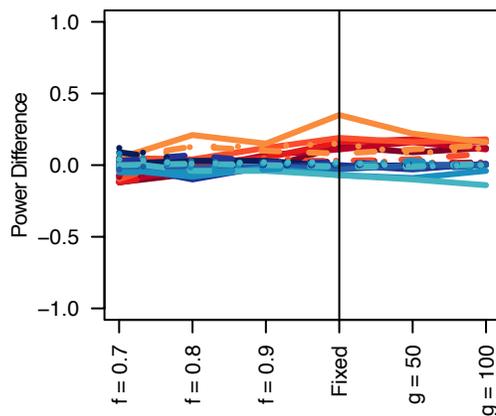
**D** Demo 2: XP-nSL;  $t_d = 4000$



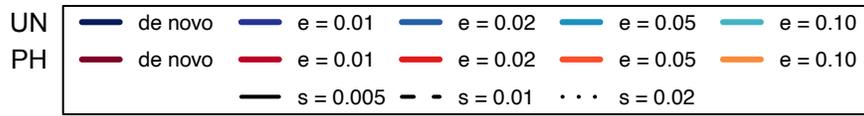
**E** Demo 3: XP-EHH;  $t_d = 4000$



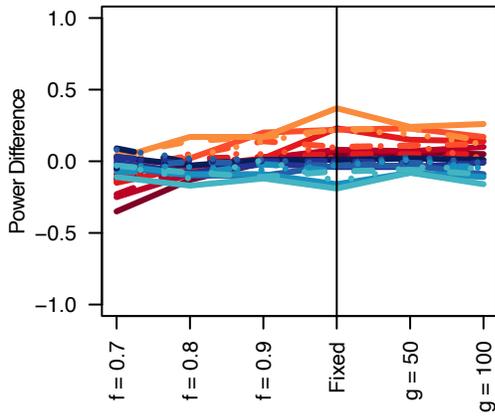
**F** Demo 3: XP-nSL;  $t_d = 4000$



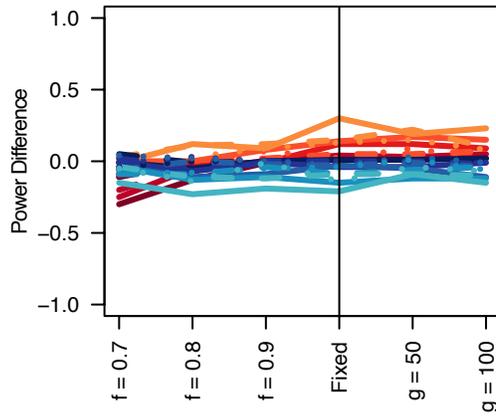
368 **Figure S33.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
369 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
370 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
371 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
372 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
373 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 50$  diploid samples from each population.  $s$   
374 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
375 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
376 4000 is the time in generations since the two populations diverged.



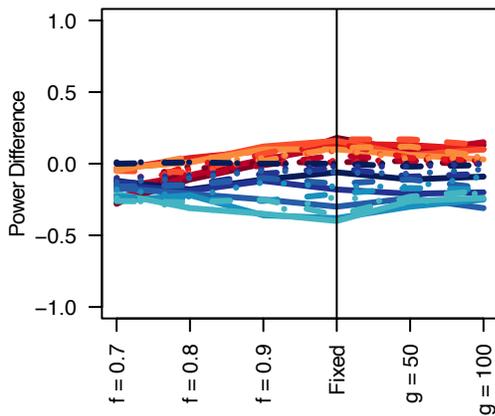
**A** Demo 1: XP-EHH;  $t_d = 8000$



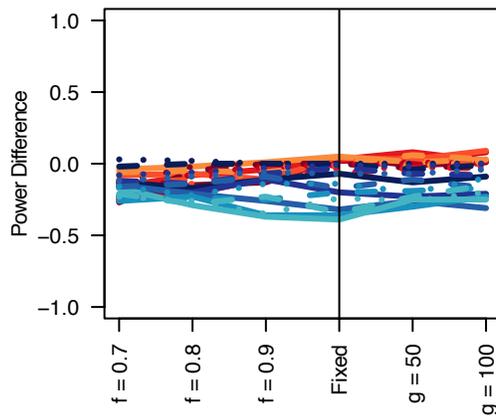
**B** Demo 1: XP-nSL;  $t_d = 8000$



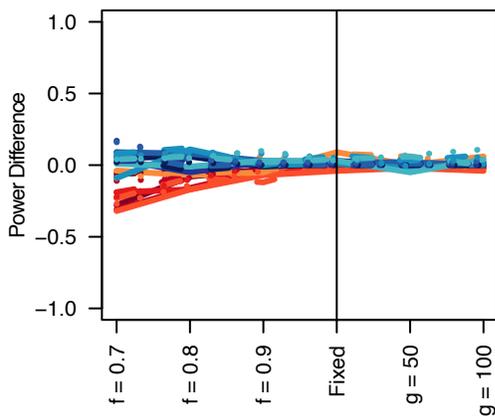
**C** Demo 2: XP-EHH;  $t_d = 8000$



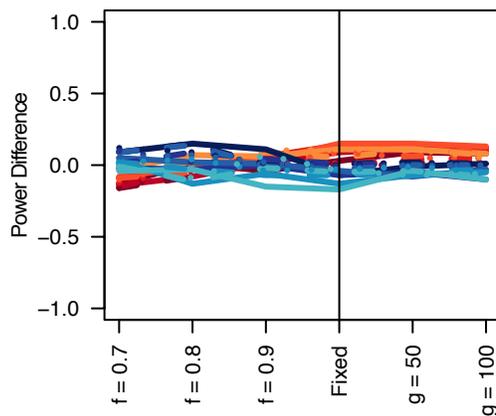
**D** Demo 2: XP-nSL;  $t_d = 8000$



**E** Demo 3: XP-EHH;  $t_d = 8000$

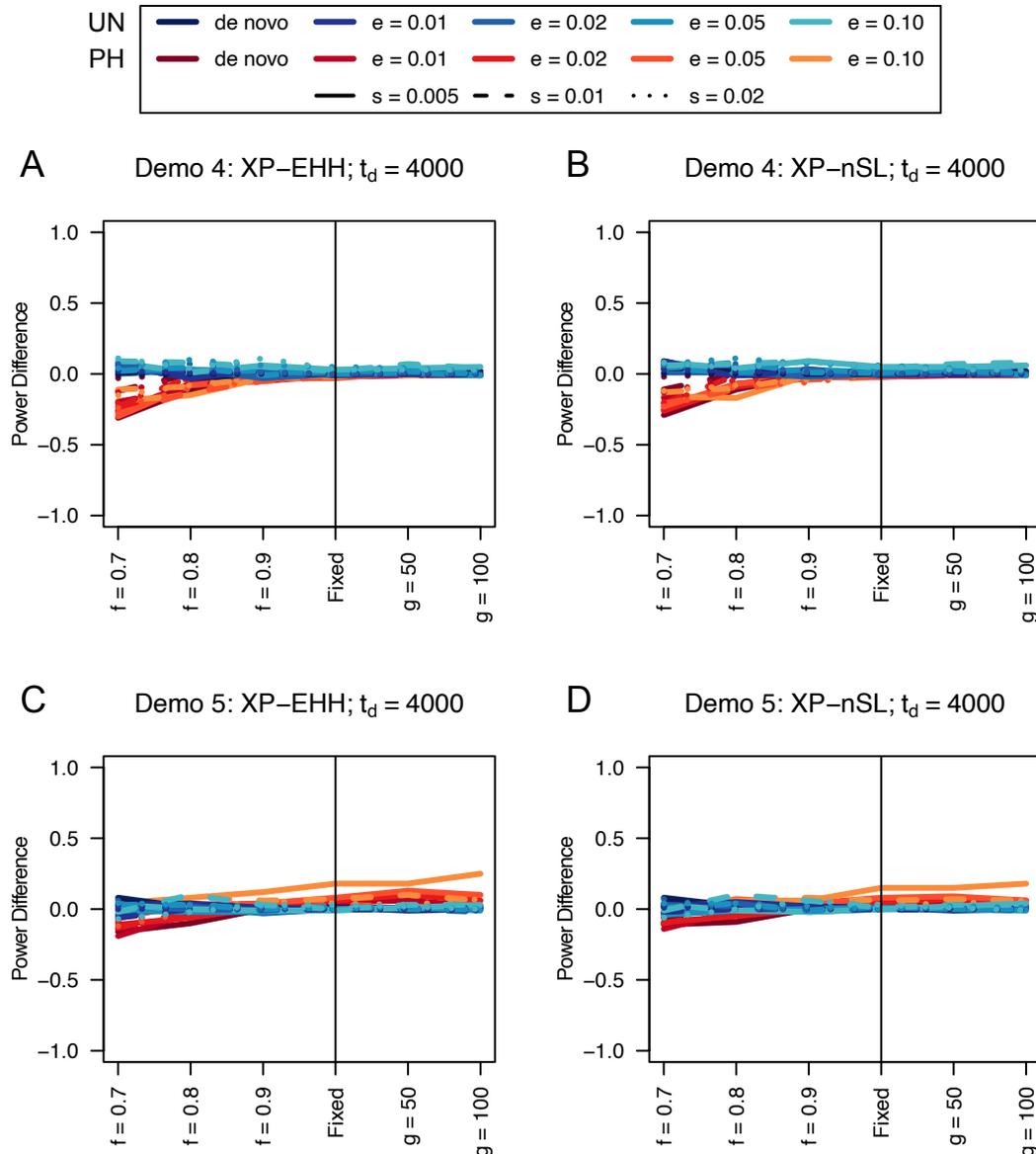


**F** Demo 3: XP-nSL;  $t_d = 8000$



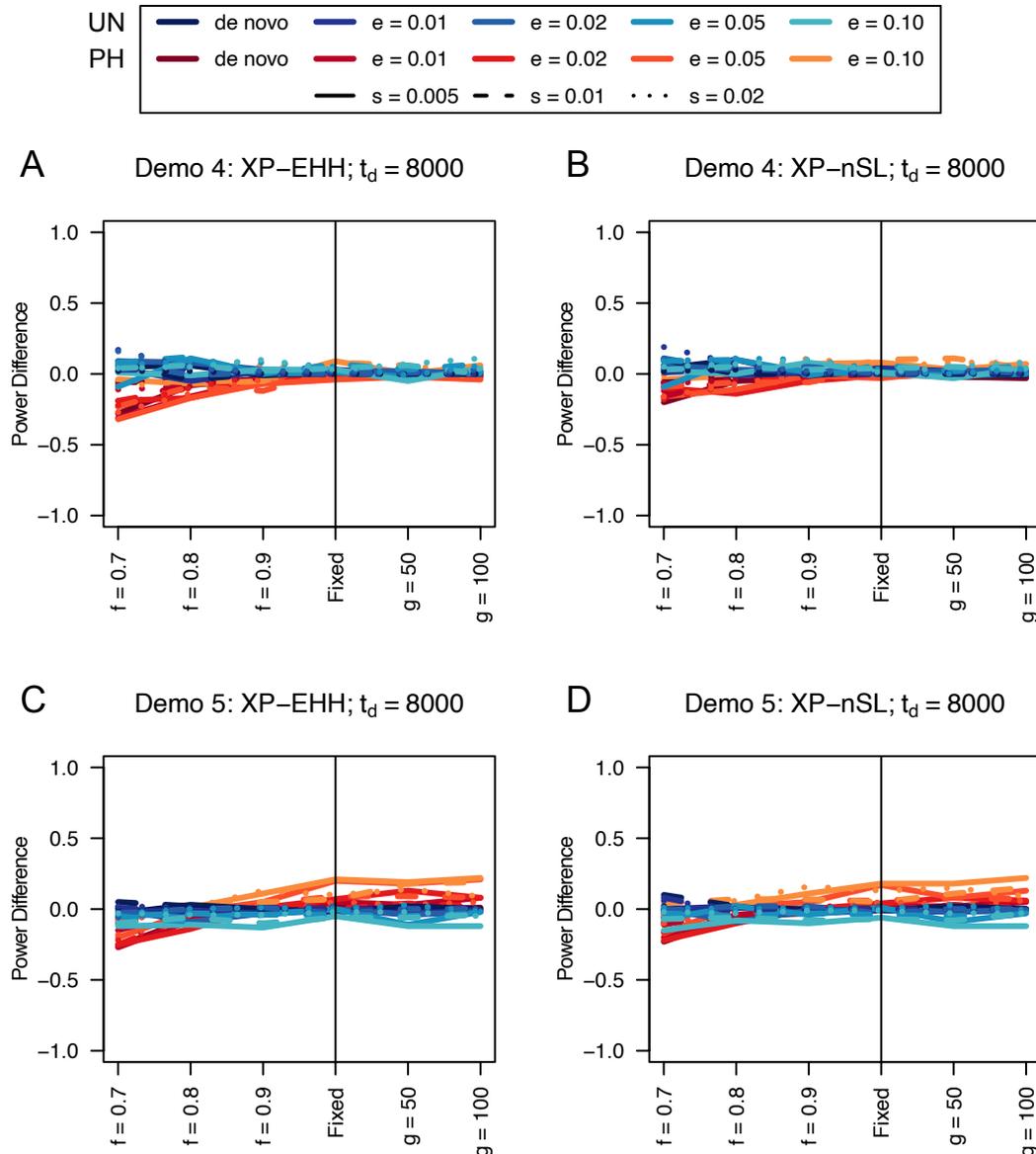
378 **Figure S34.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
379 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
380 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
381 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
382 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
383 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 50$  diploid samples from each population.  $s$   
384 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
385 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
386 8000 is the time in generations since the two populations diverged.

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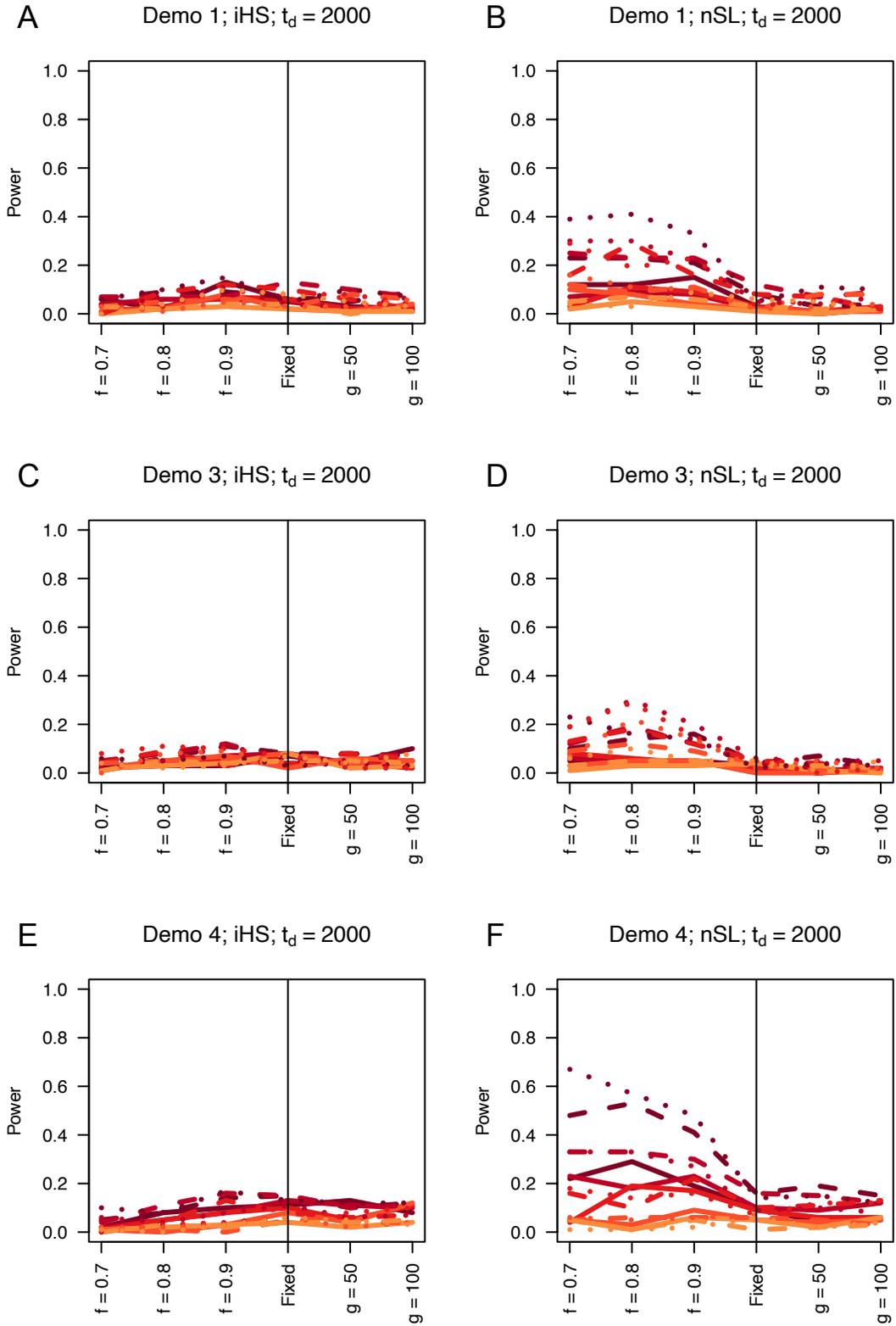
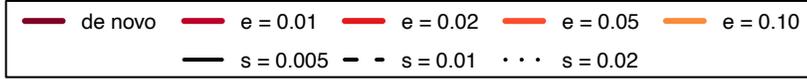
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**Figure S35.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.

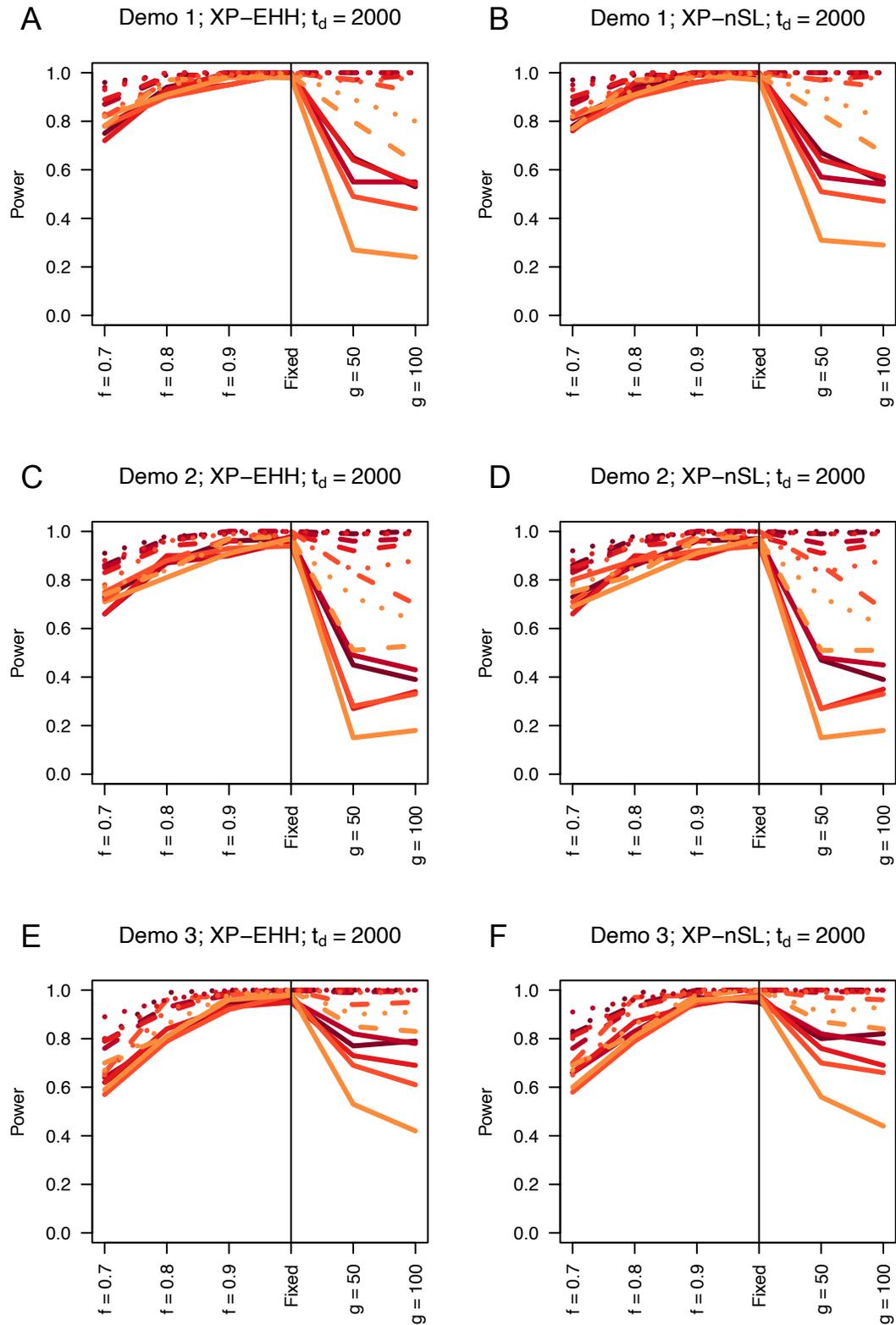
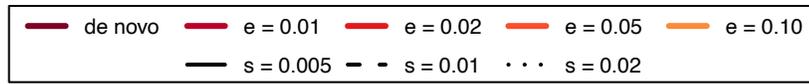


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**Table S36.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 50$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.

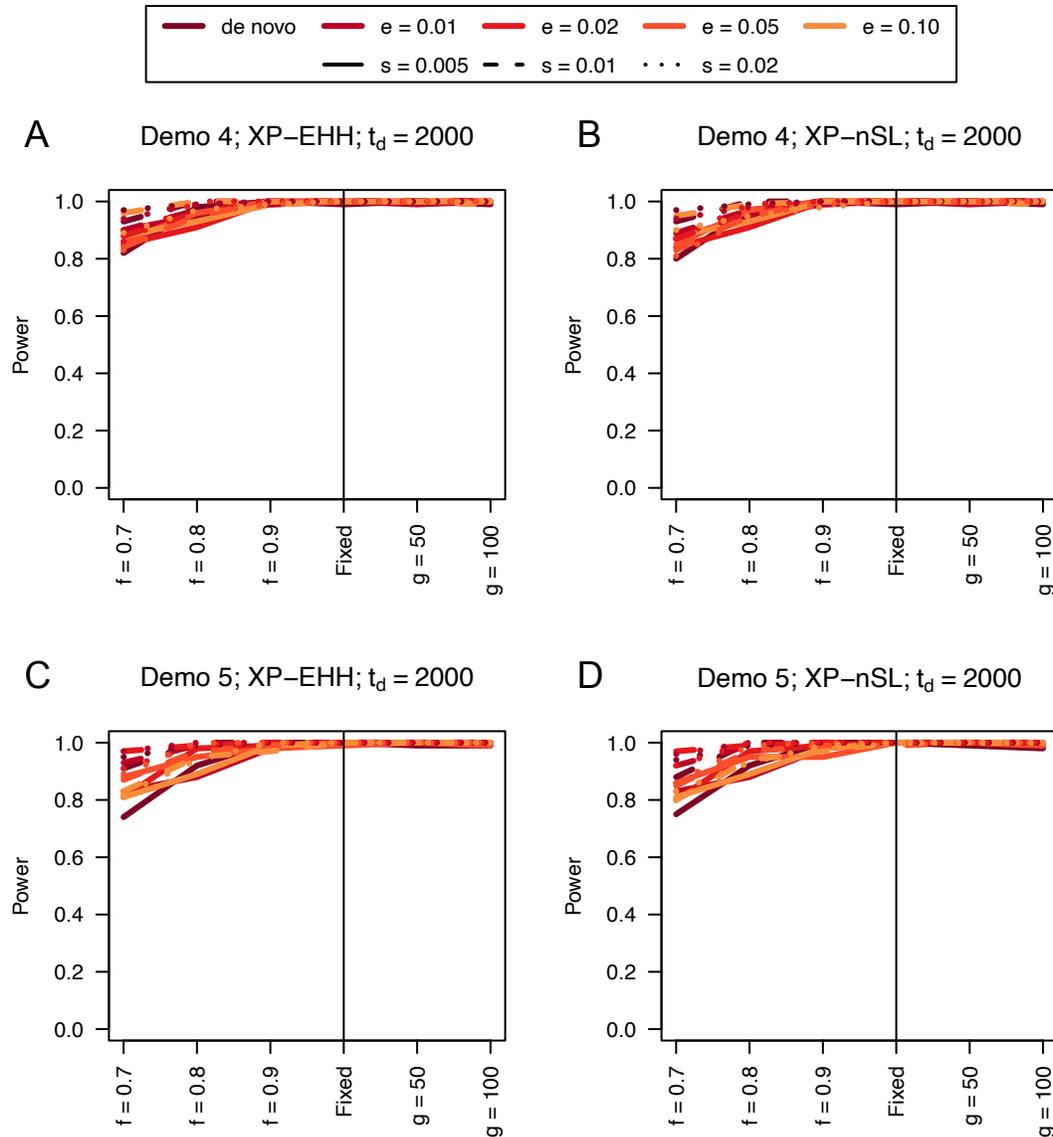


416 **Figure S37.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
417 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$   
418 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
419 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
420 selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



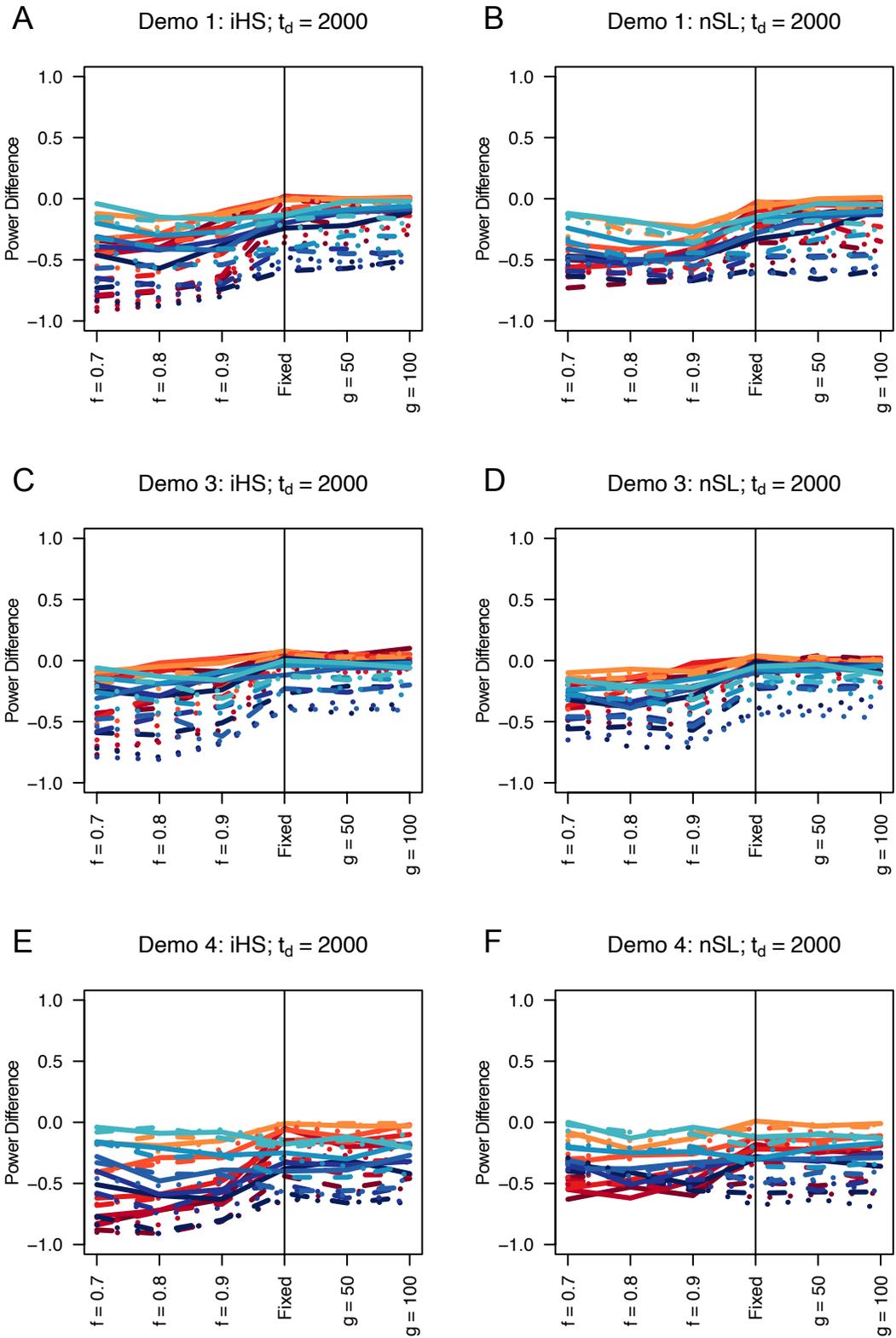
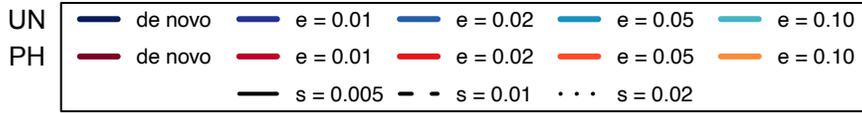
422 **Figure S38.** Power curves for unphased implementations of XP-EHH (A, C, and E) and XP-nSL (B, D,  
423 and F) under demographic histories Demo 1 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n$   
424 = 20 diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the  
425 adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is  
426 the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two  
427 populations diverged.

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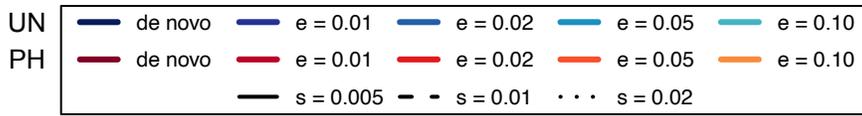


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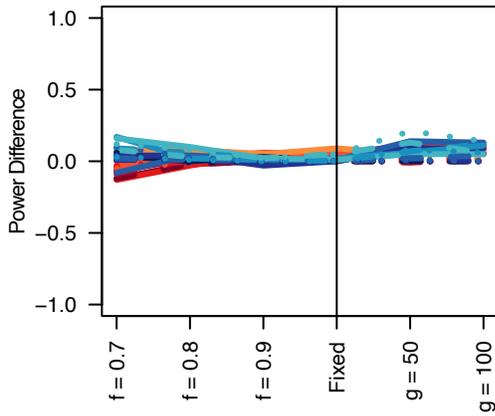
**Figure S39.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 20$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



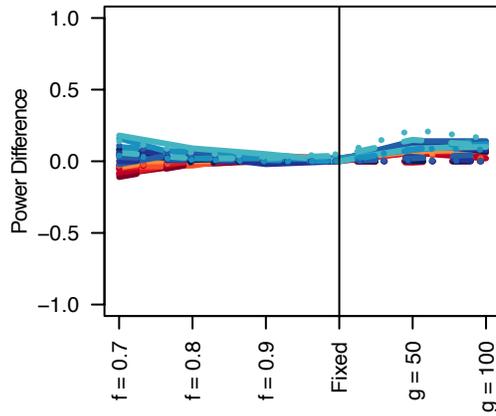
447 **Figure S40.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
448 and F) and phased implementations. Blue curves represent the power difference between the unphased  
449 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
450 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
451 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
452 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$  diploid samples.  $s$  is the selection coefficient,  $f$   
453 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
454 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
455 generations since the two populations diverged.



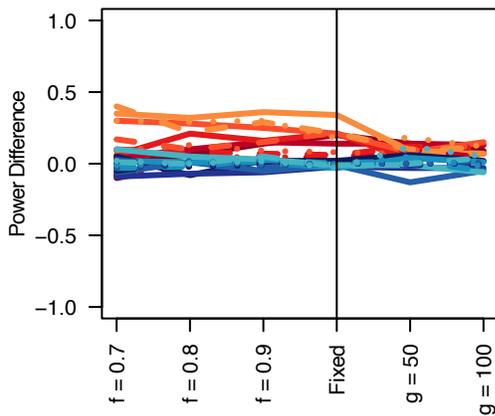
**A** Demo 1: XP-EHH;  $t_d = 2000$



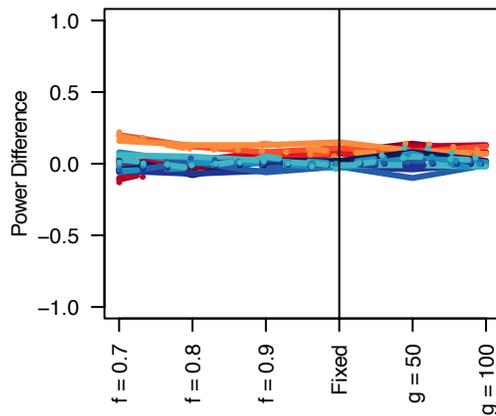
**B** Demo 1: XP-nSL;  $t_d = 2000$



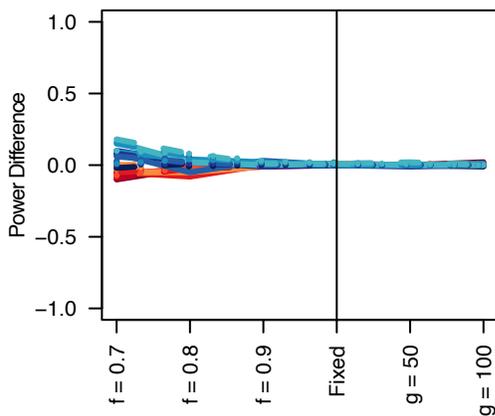
**C** Demo 2: XP-EHH;  $t_d = 2000$



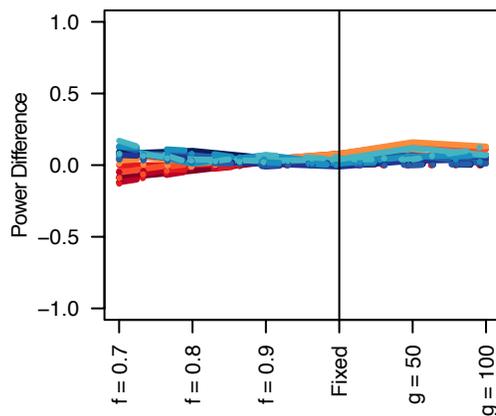
**D** Demo 2: XP-nSL;  $t_d = 2000$



**E** Demo 3: XP-EHH;  $t_d = 2000$

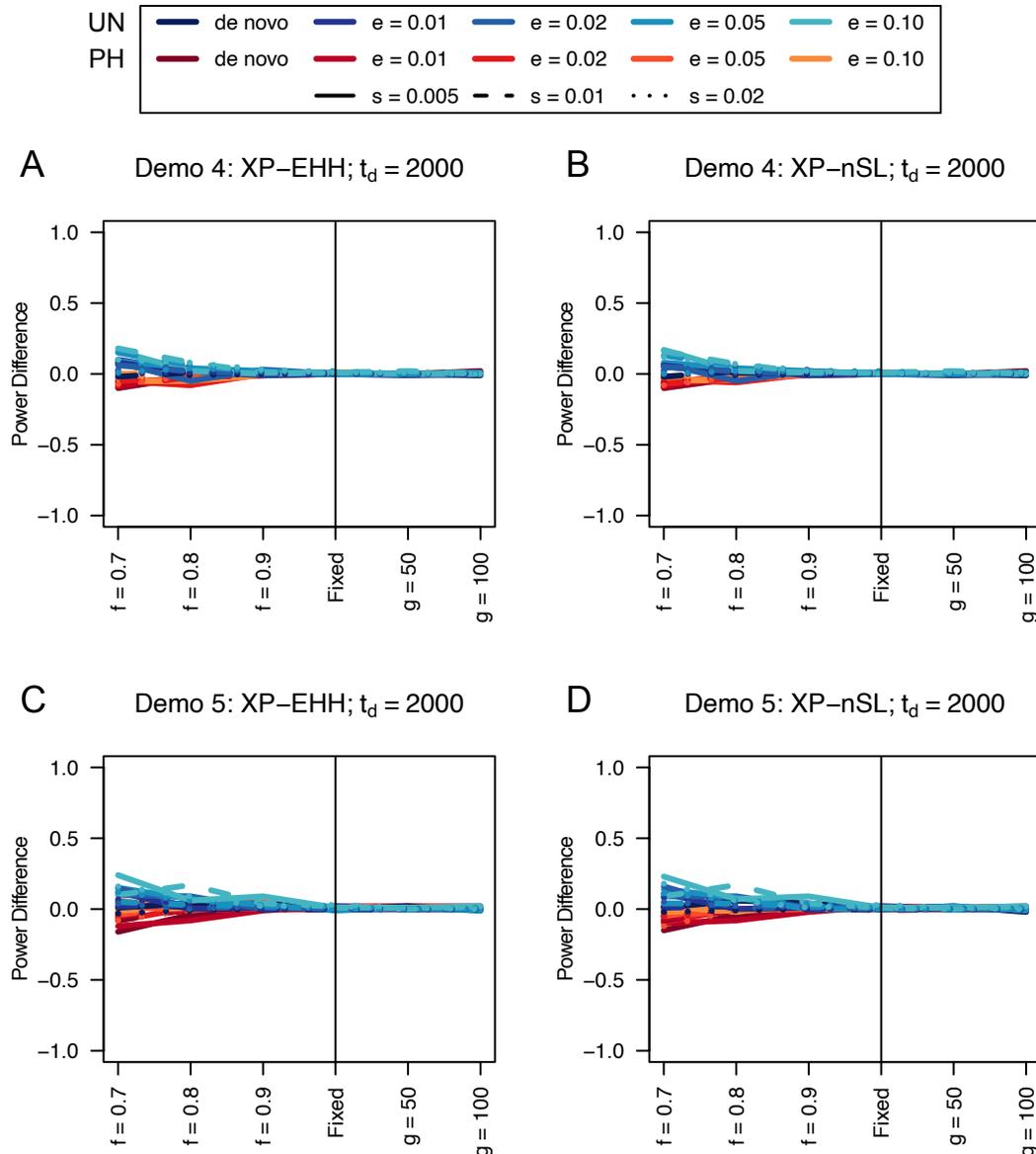


**F** Demo 3: XP-nSL;  $t_d = 2000$

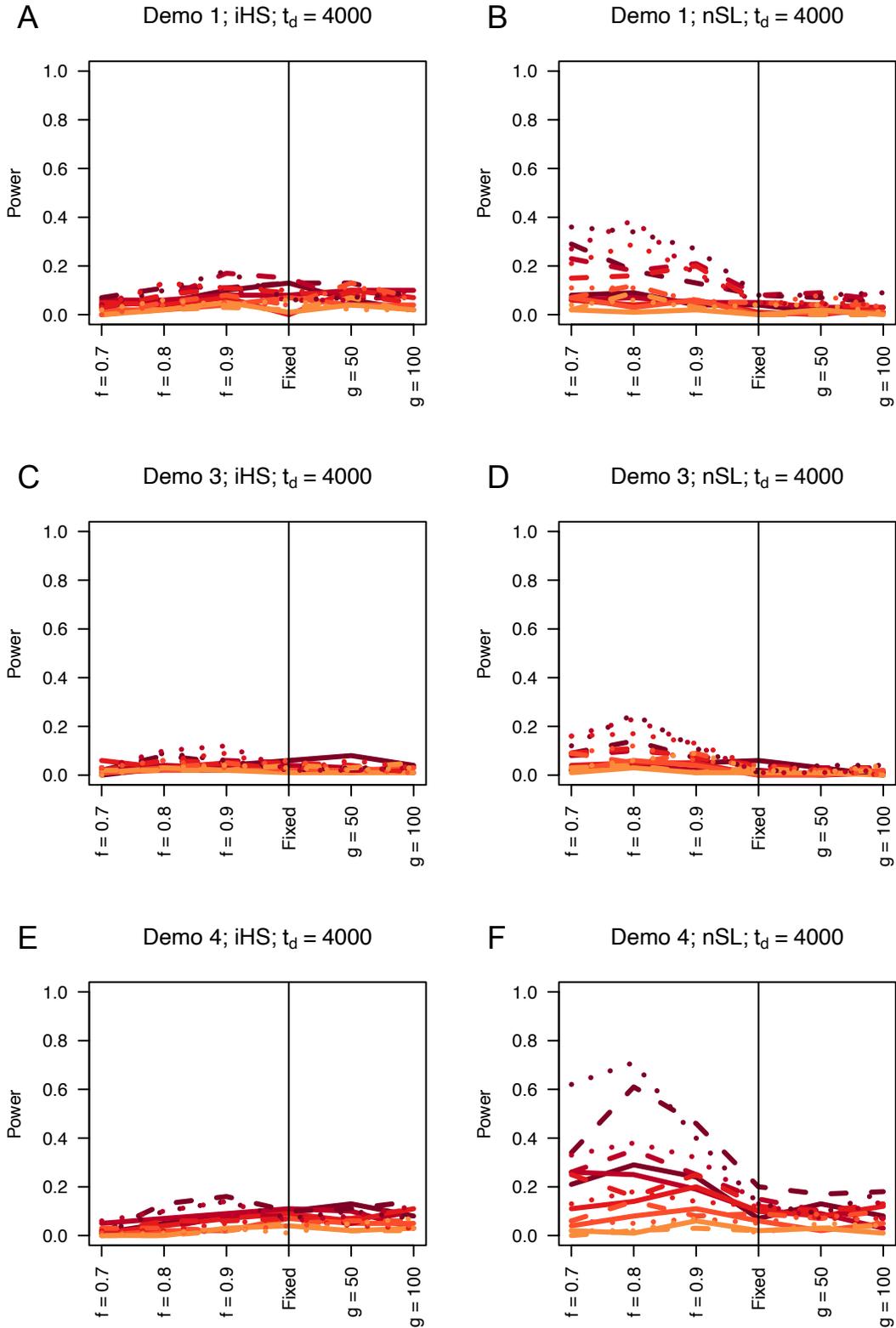
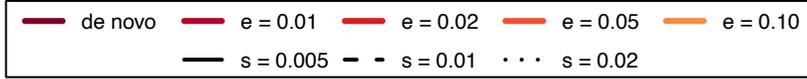


457 **Figure S41.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
458 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
459 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
460 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
461 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
462 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 20$  diploid samples from each population.  $s$   
463 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
464 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
465 2000 is the time in generations since the two populations diverged.

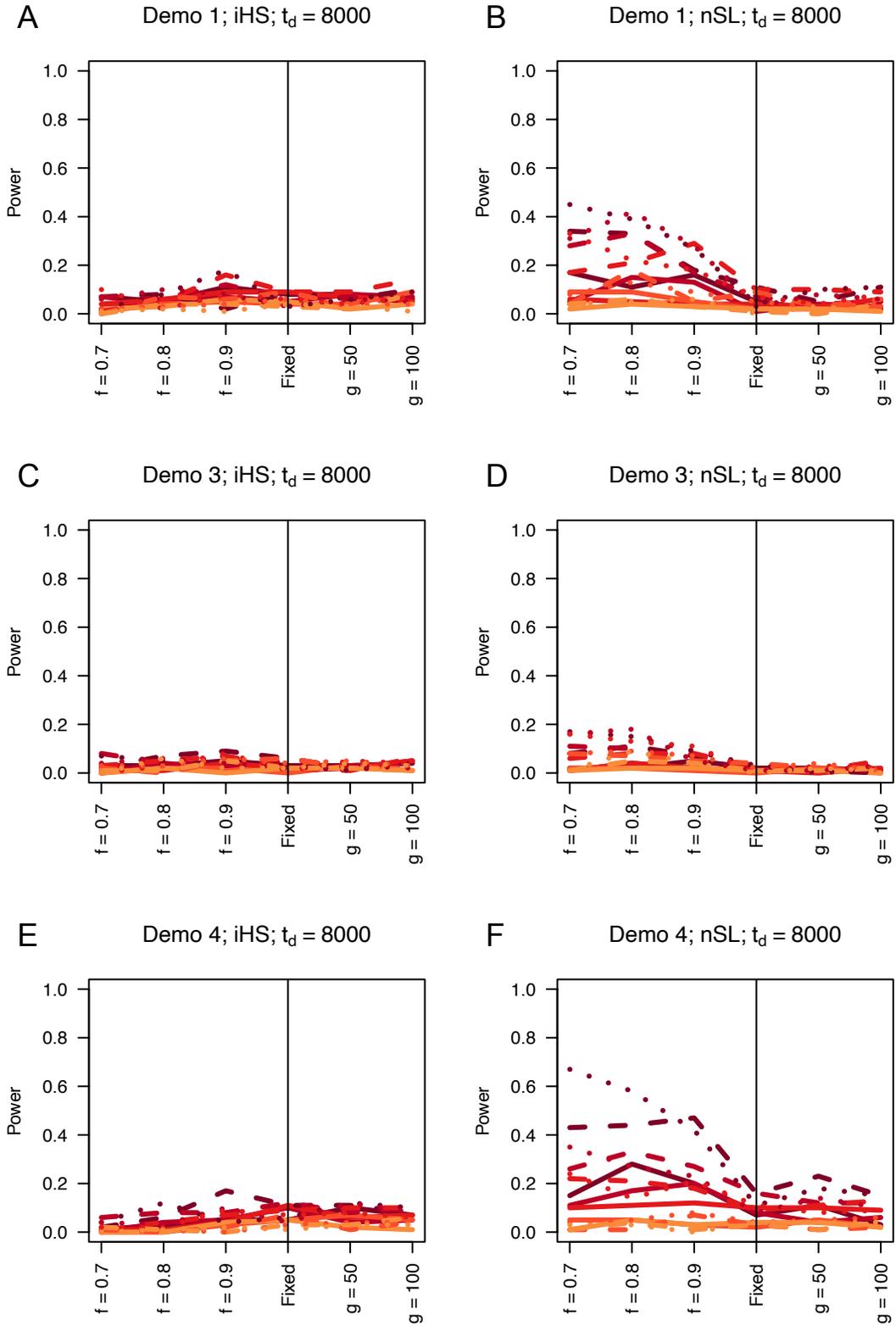
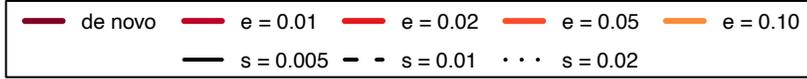
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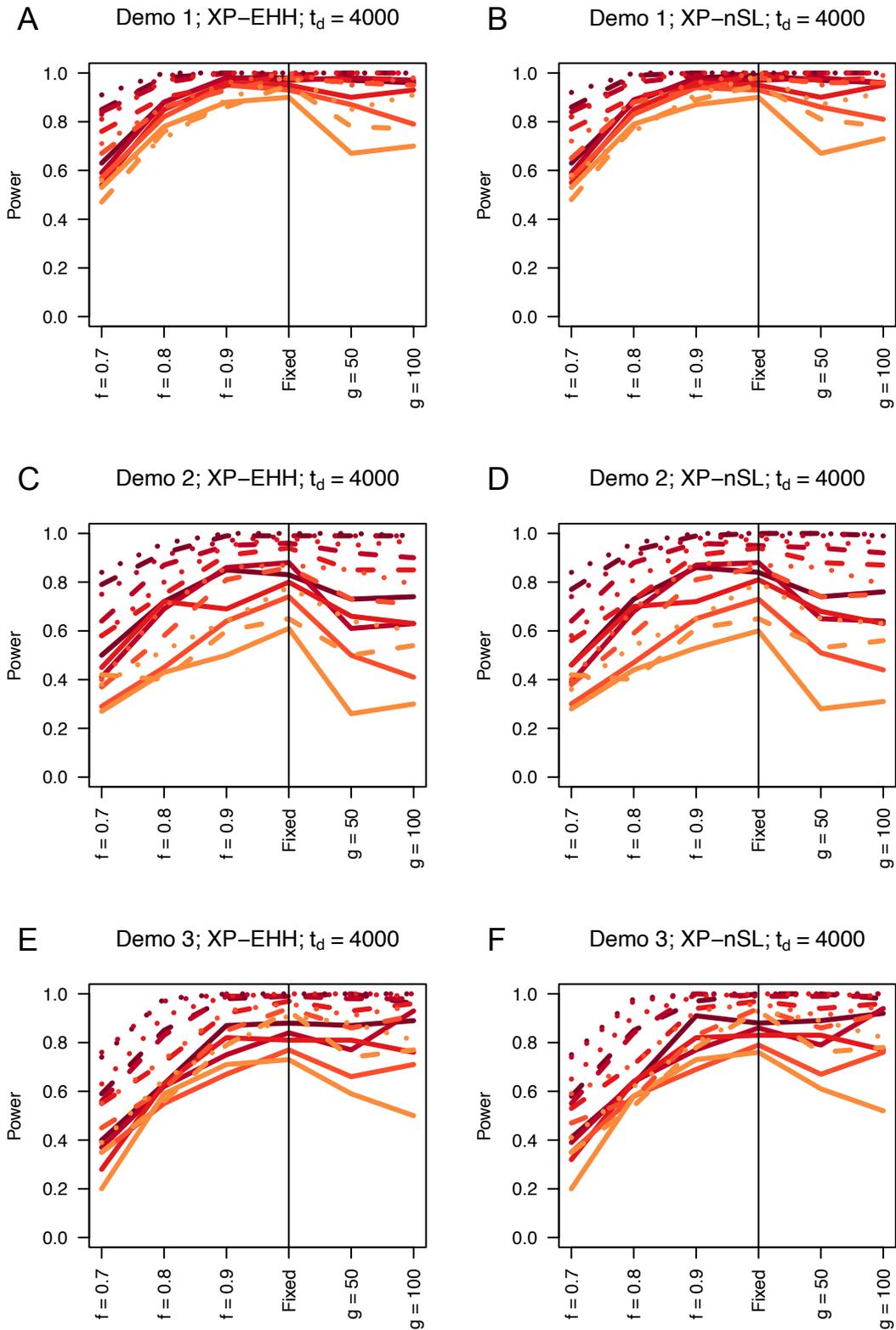
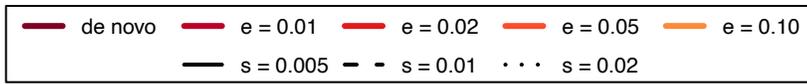
474  
 475 **Figure S42.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B  
 476 and D) and phased implementations. Blue curves represent the power difference between the unphased  
 477 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
 478 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
 479 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and  
 480 B), and Demo 5 (C and D) with  $n = 20$  diploid samples from each population.  $s$  is the selection  
 481 coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations  
 482 at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
 483 generations since the two populations diverged.



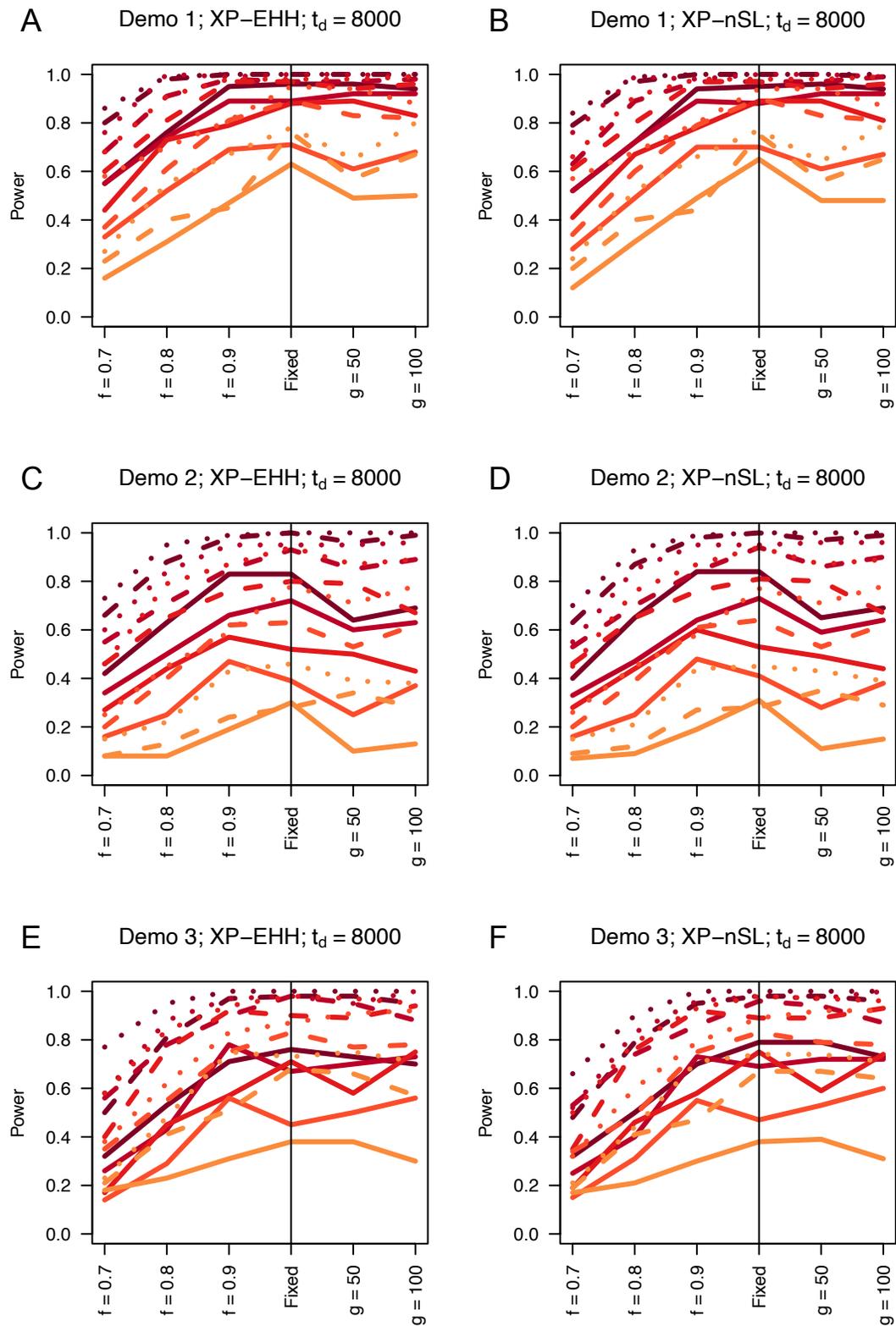
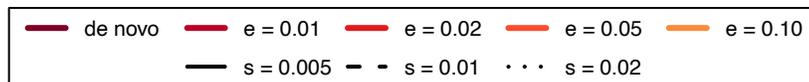
485 **Figure S43.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
486 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$   
487 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
488 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
489 selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



491 **Figure S44.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
492 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$   
493 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
494 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
495 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.

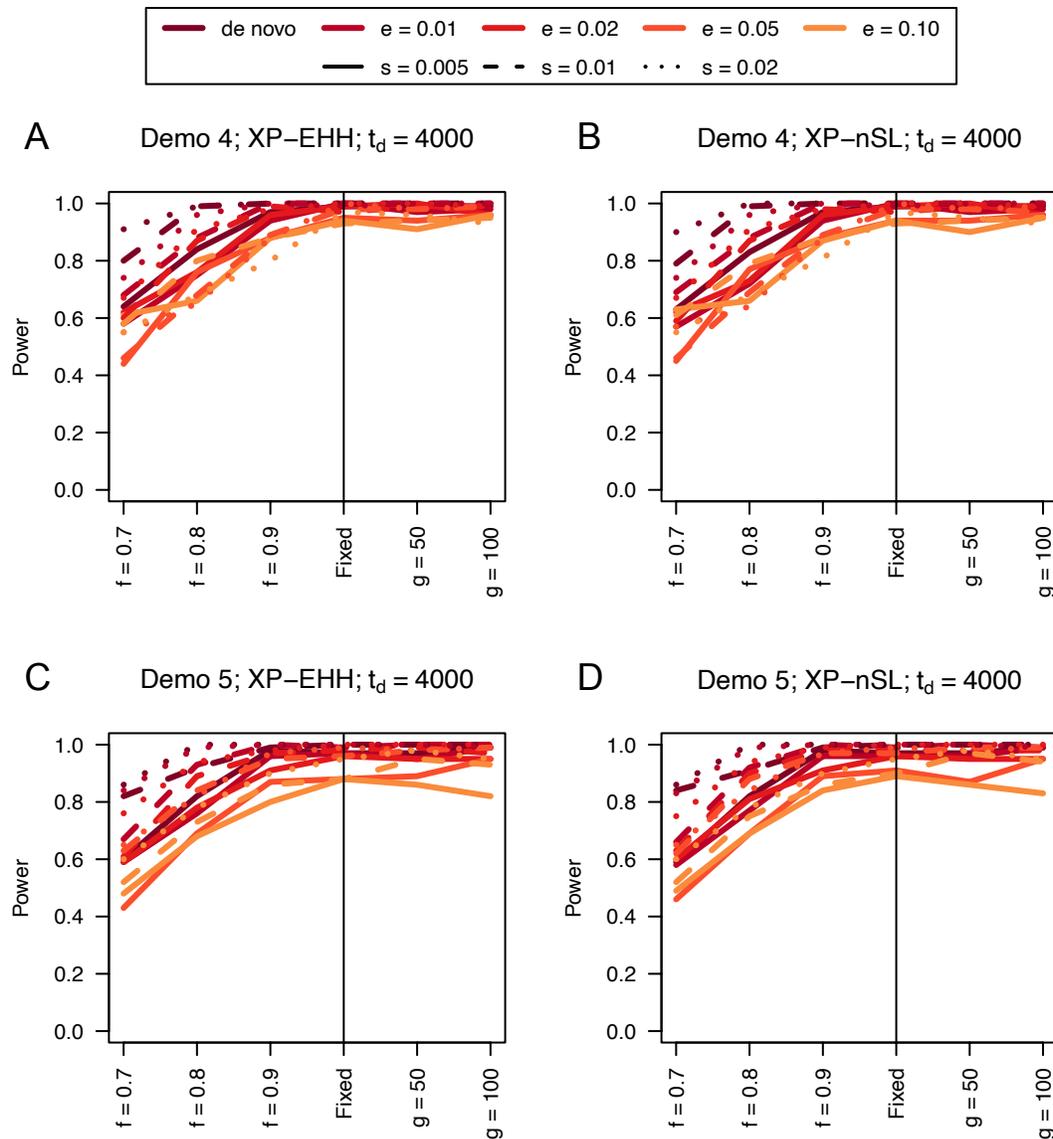


497 **Figure S45.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
498 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
499 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
500 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
501 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
502 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 20$  diploid samples from each population.  $s$   
503 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
504 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
505 4000 is the time in generations since the two populations diverged.



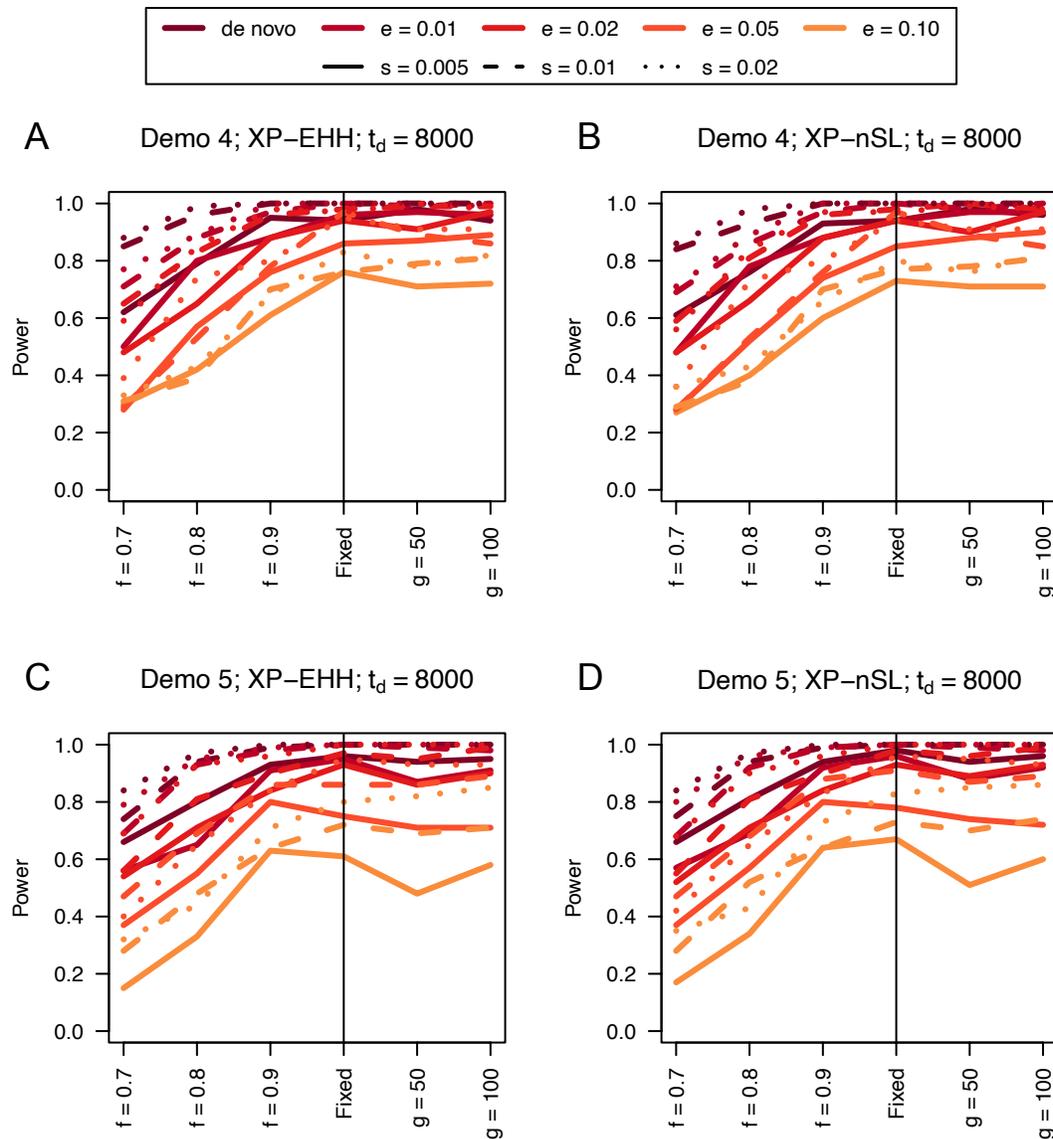
507 **Figure S46.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
508 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
509 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
510 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
511 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
512 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 20$  diploid samples from each population.  $s$   
513 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
514 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
515 8000 is the time in generations since the two populations diverged.

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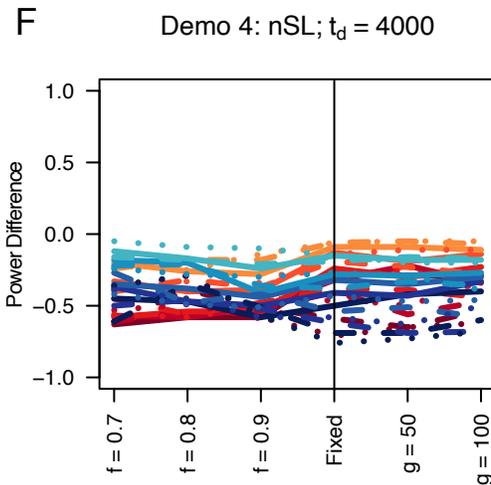
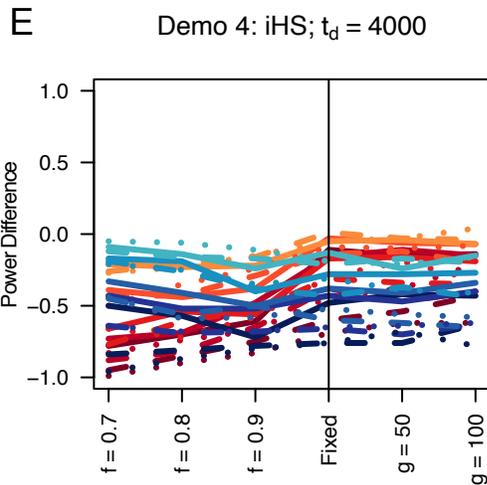
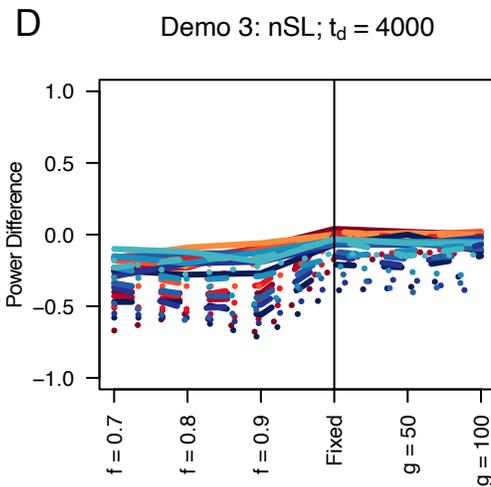
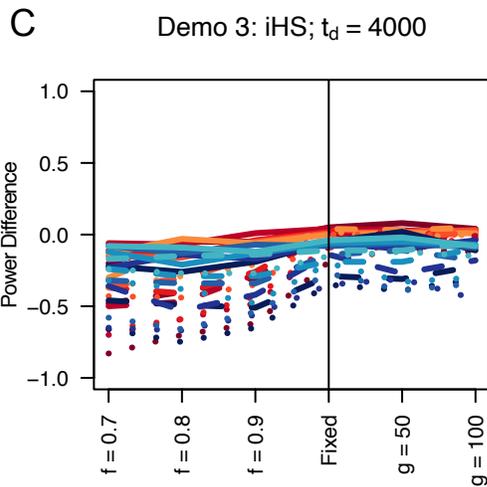
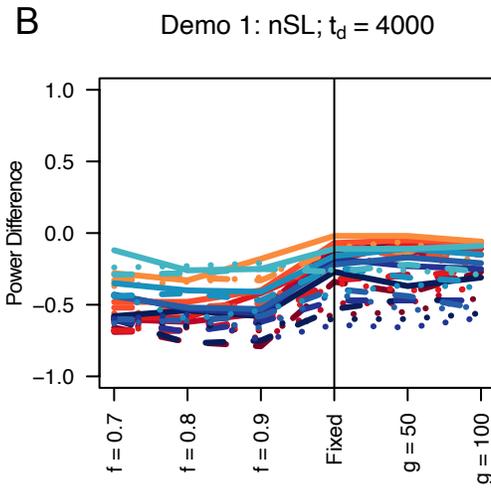
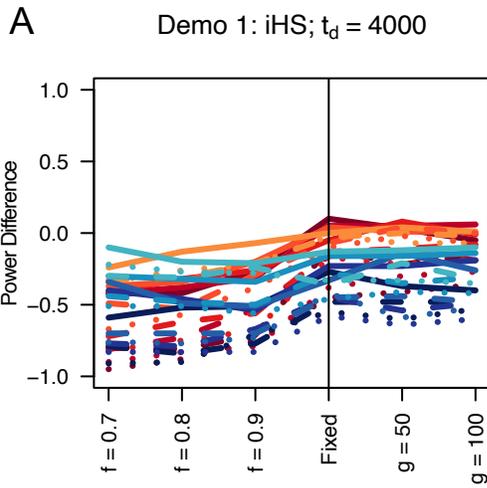
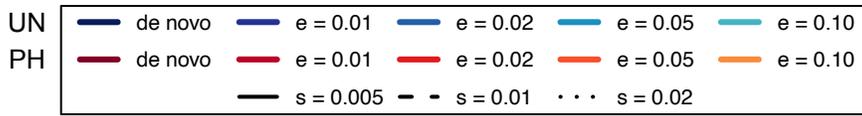


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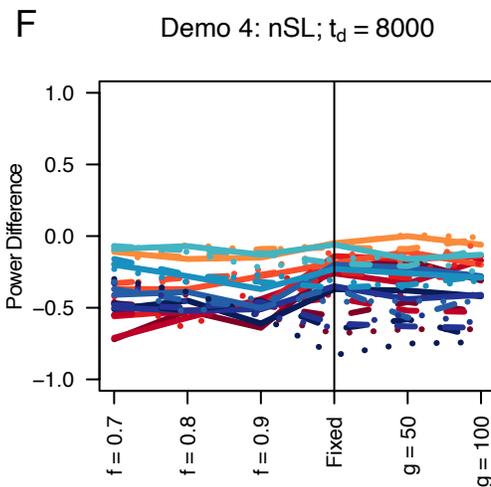
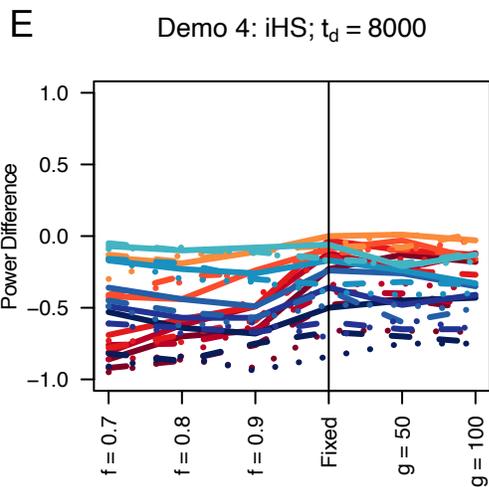
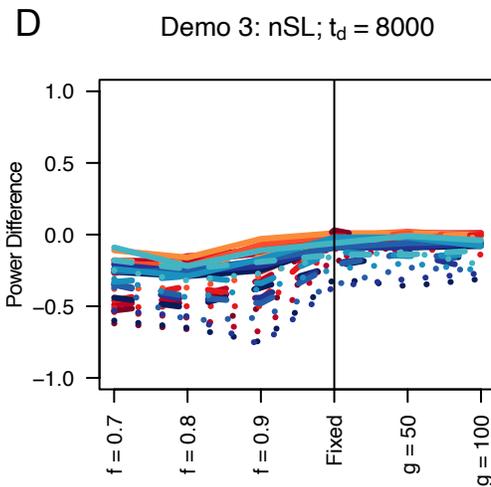
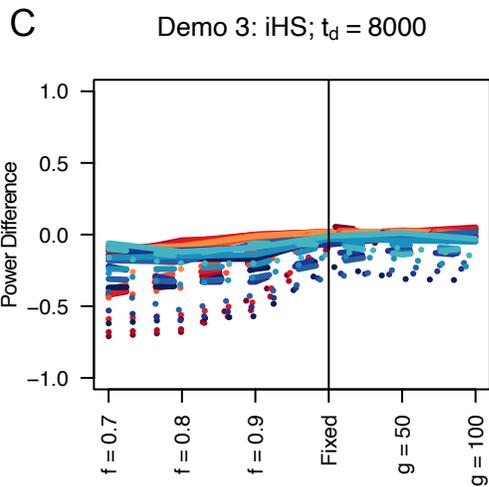
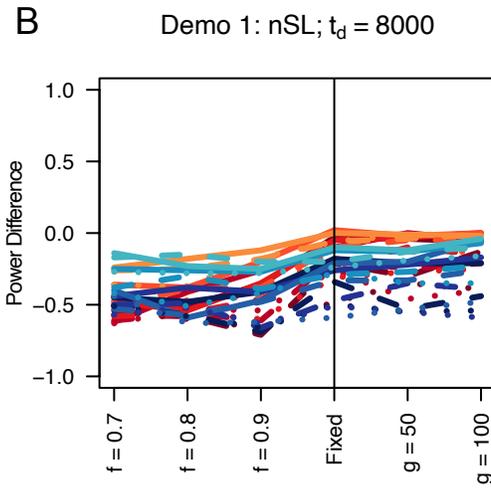
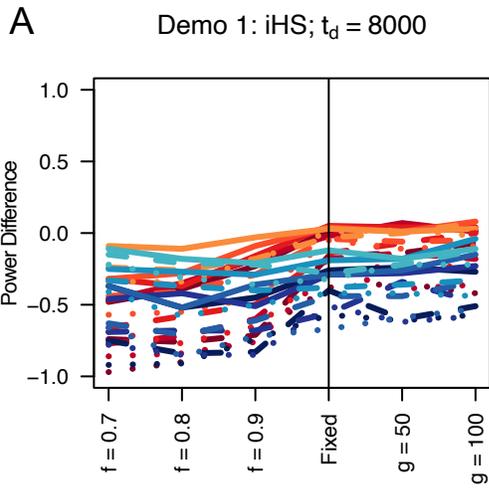
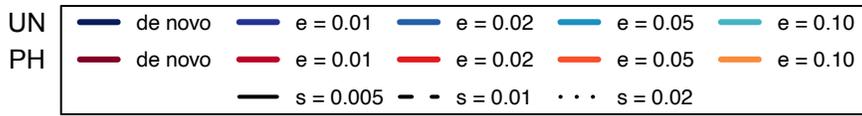
**Figure S47.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 20$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



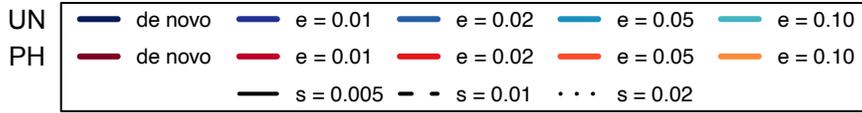
531  
 532 **Figure S48.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D)  
 533 under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 20$  diploid samples from  
 534 each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
 535 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
 536 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



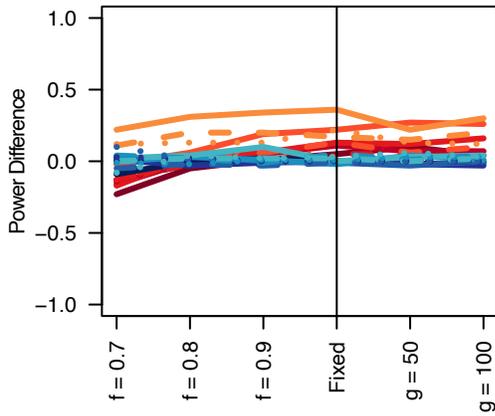
538 **Figure S49.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
539 and F) and phased implementations. Blue curves represent the power difference between the unphased  
540 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
541 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
542 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
543 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$  diploid samples.  $s$  is the selection coefficient,  $f$   
544 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
545 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
546 generations since the two populations diverged.



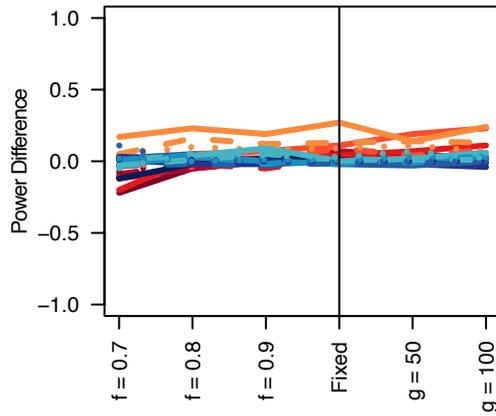
548 **Figure S50.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
549 and F) and phased implementations. Blue curves represent the power difference between the unphased  
550 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
551 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
552 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
553 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 20$  diploid samples.  $s$  is the selection coefficient,  $f$   
554 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
555 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in  
556 generations since the two populations diverged.



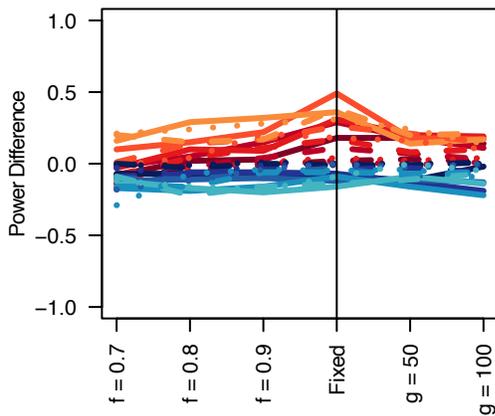
**A** Demo 1: XP-EHH;  $t_d = 4000$



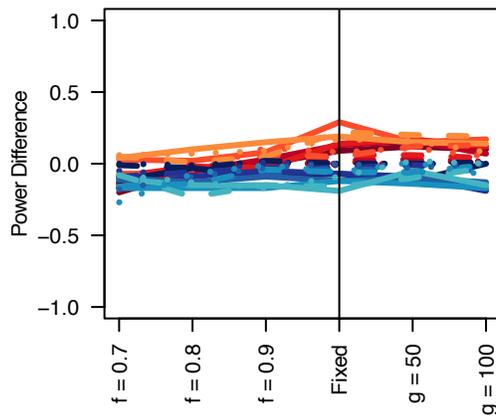
**B** Demo 1: XP-nSL;  $t_d = 4000$



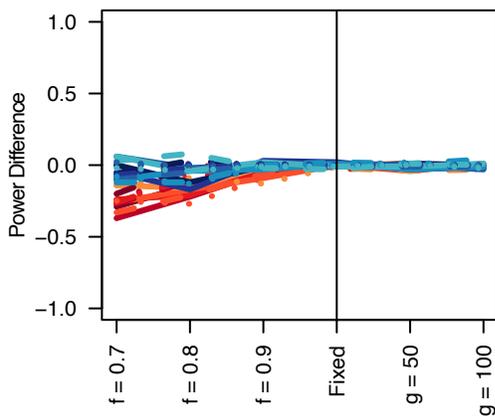
**C** Demo 2: XP-EHH;  $t_d = 4000$



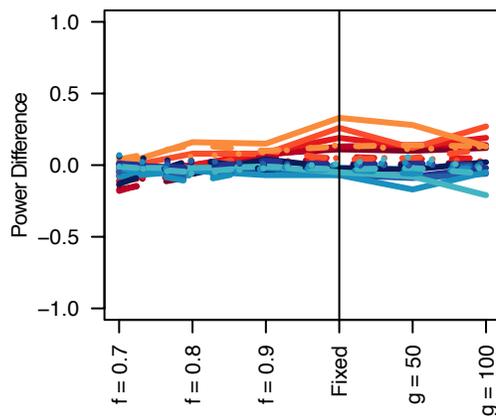
**D** Demo 2: XP-nSL;  $t_d = 4000$



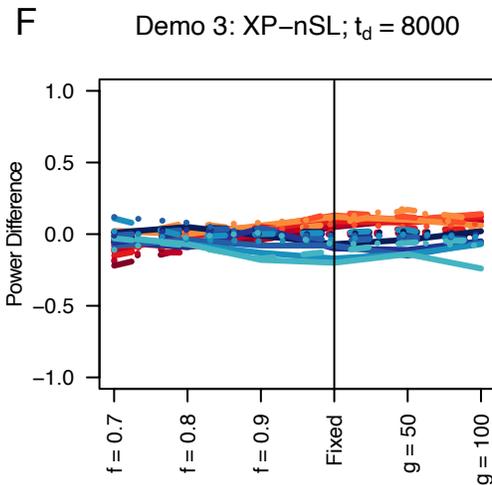
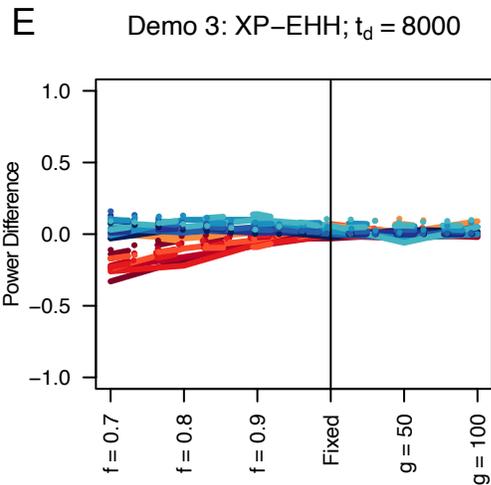
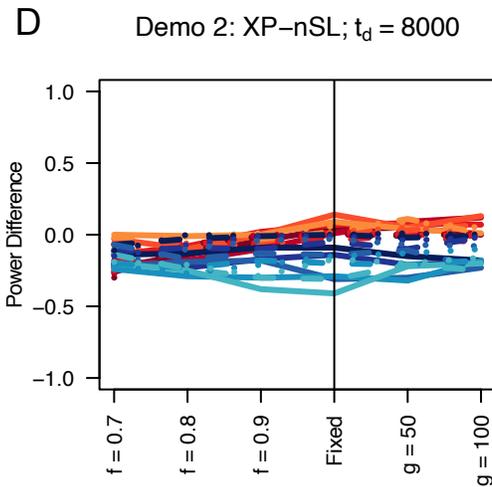
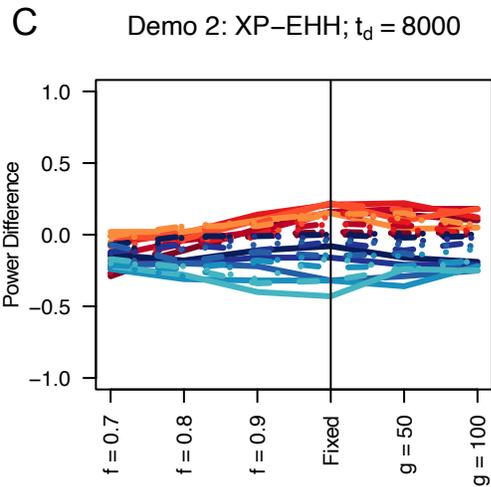
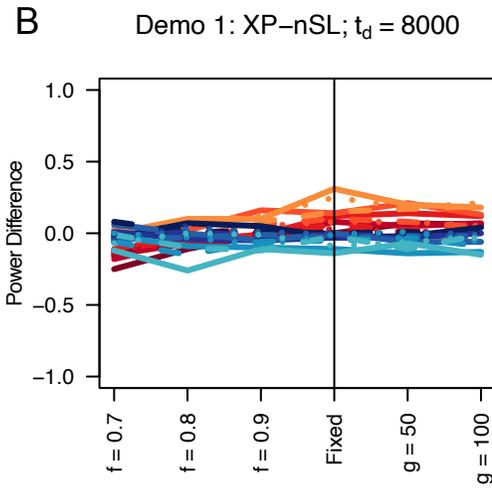
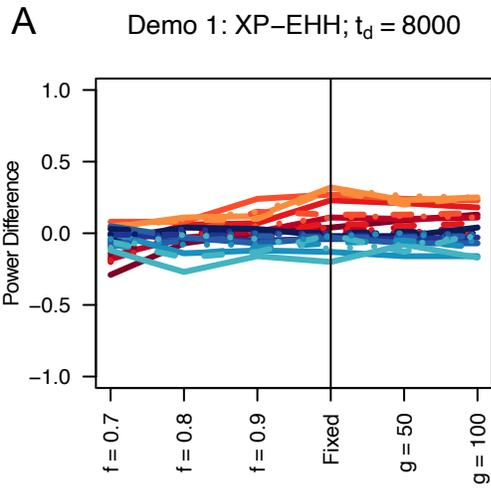
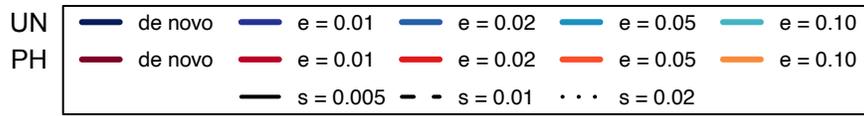
**E** Demo 3: XP-EHH;  $t_d = 4000$



**F** Demo 3: XP-nSL;  $t_d = 4000$

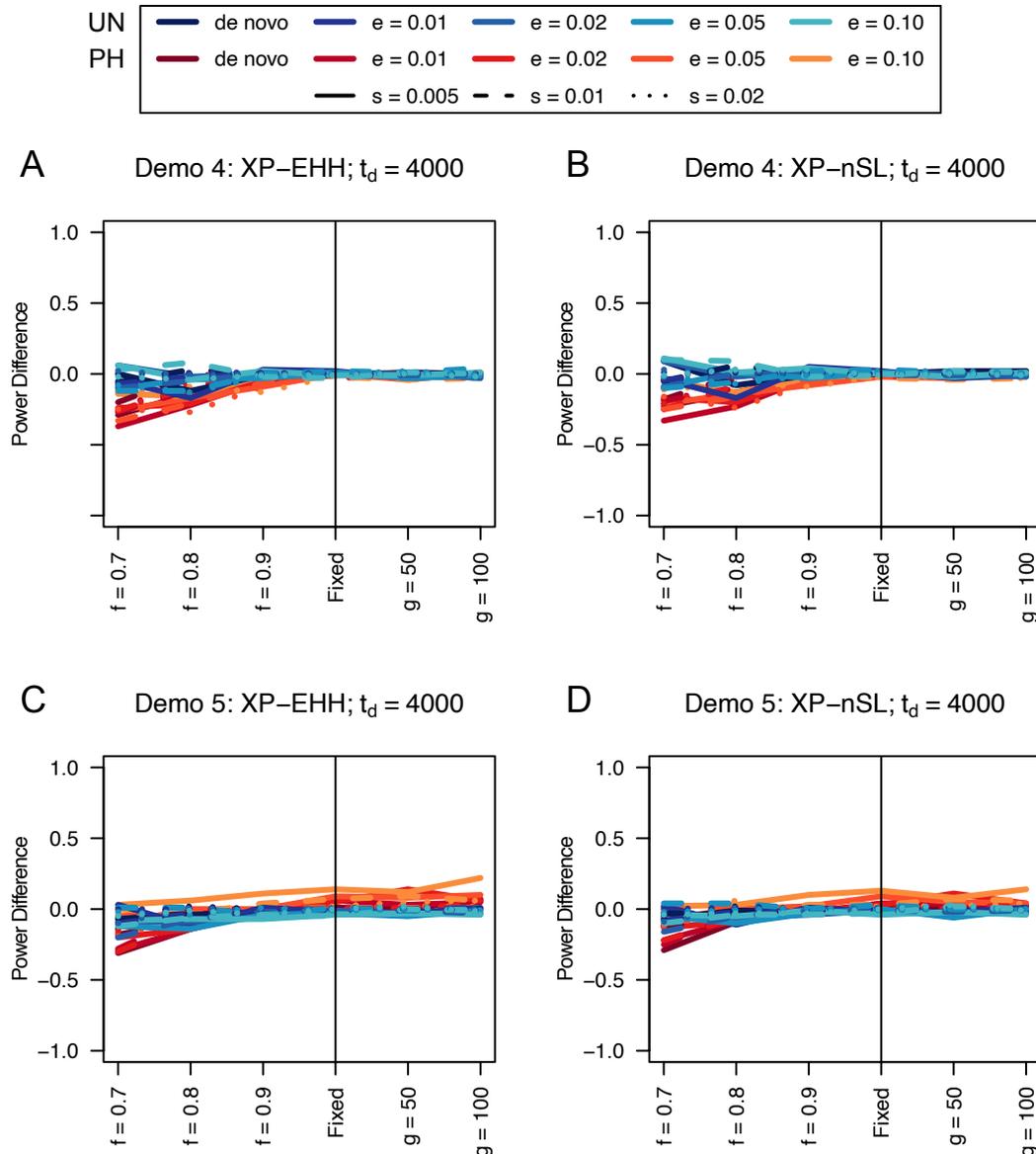


558 **Figure S51.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
559 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
560 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
561 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
562 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
563 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 20$  diploid samples from each population.  $s$   
564 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
565 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
566 4000 is the time in generations since the two populations diverged.

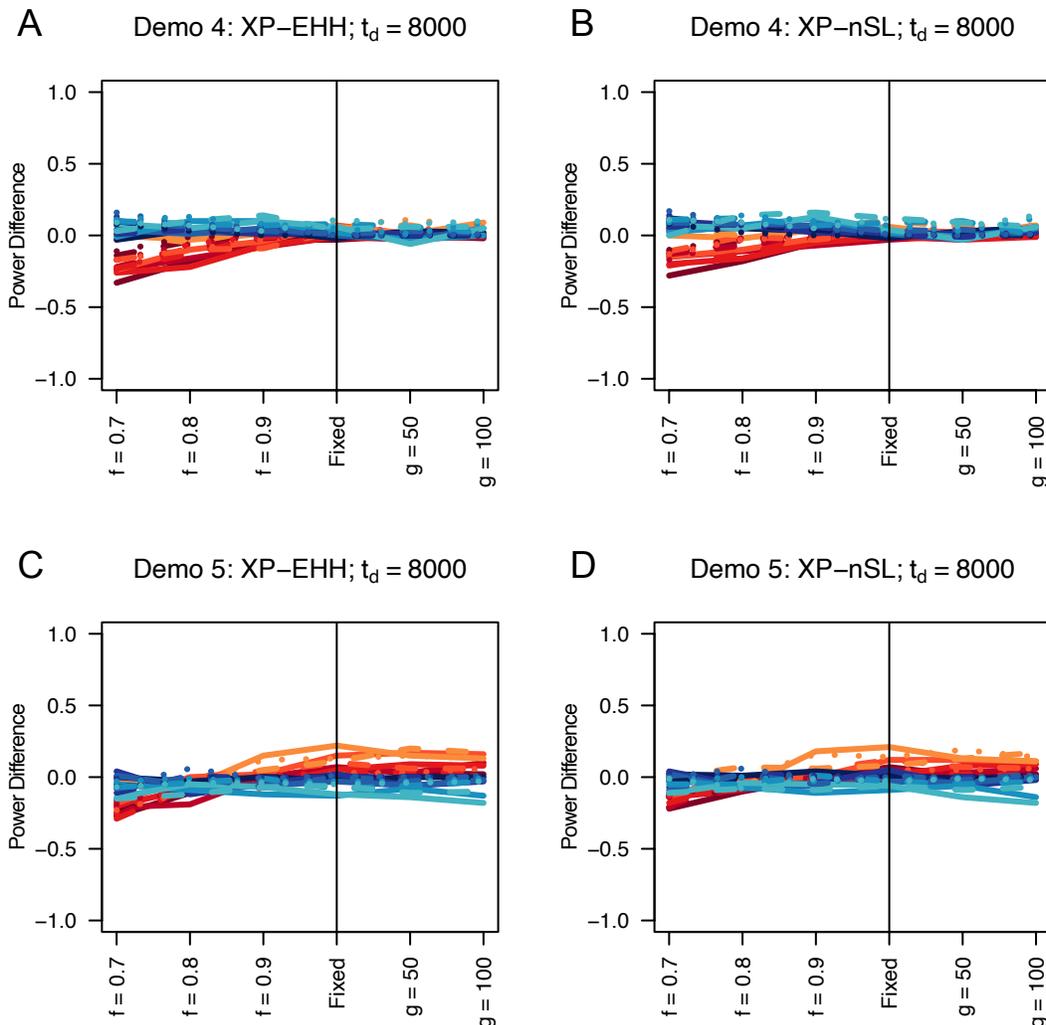
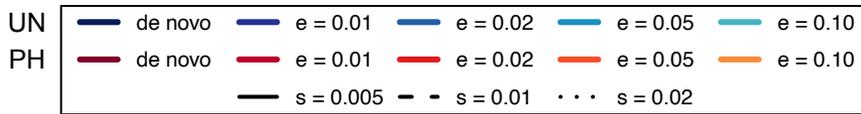


568 **Figure S52.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
569 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
570 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
571 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
572 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
573 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 20$  diploid samples from each population.  $s$   
574 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
575 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
576 8000 is the time in generations since the two populations diverged.

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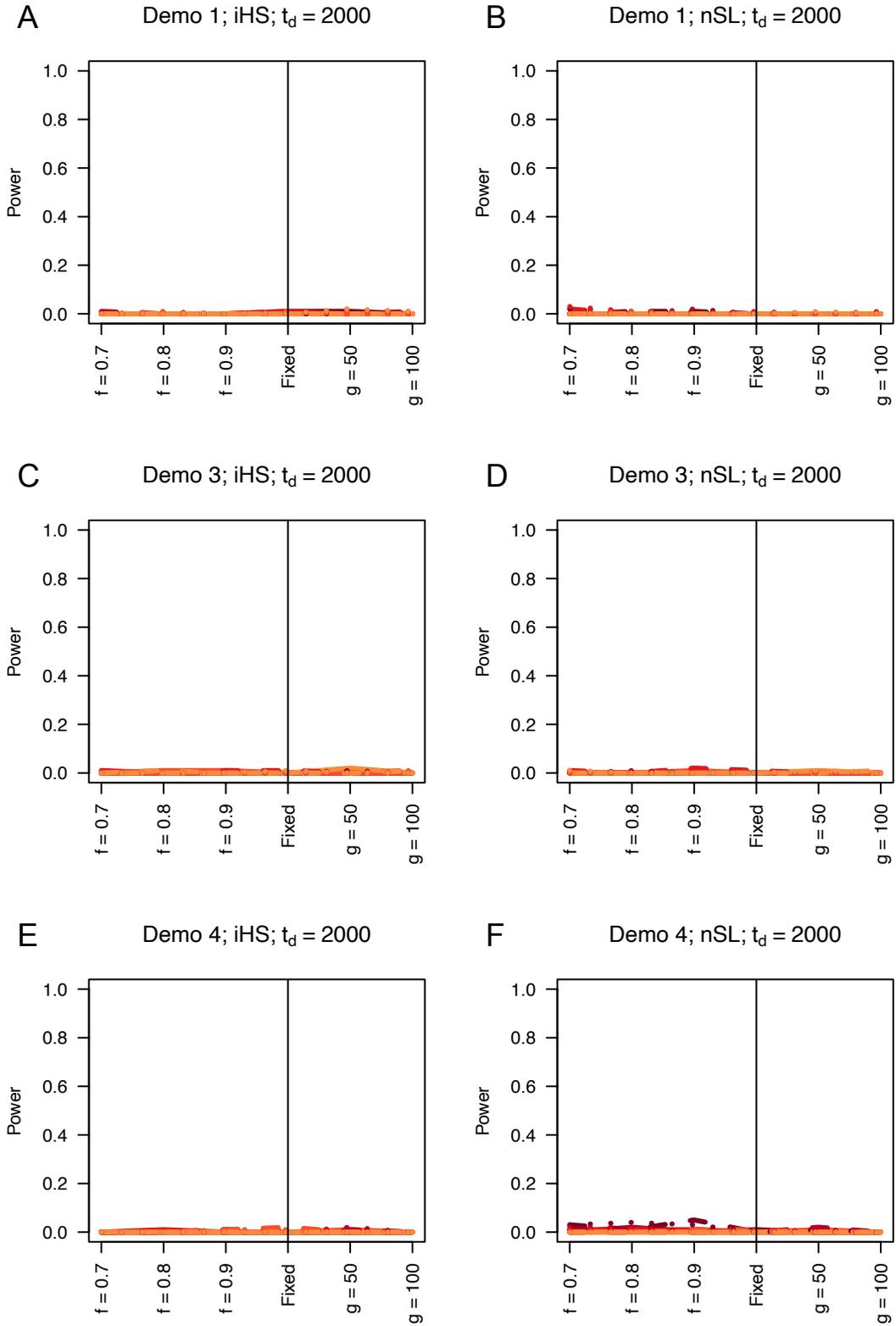
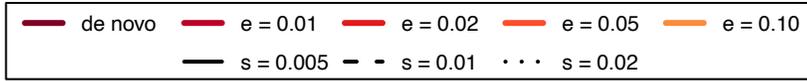


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 586 **Figure S53.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B  
 587 and D) and phased implementations. Blue curves represent the power difference between the unphased  
 588 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
 589 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
 590 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and  
 591 B), and Demo 5 (C and D) with  $n = 20$  diploid samples from each population.  $s$  is the selection  
 592 coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations  
 593 at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
 594 generations since the two populations diverged.

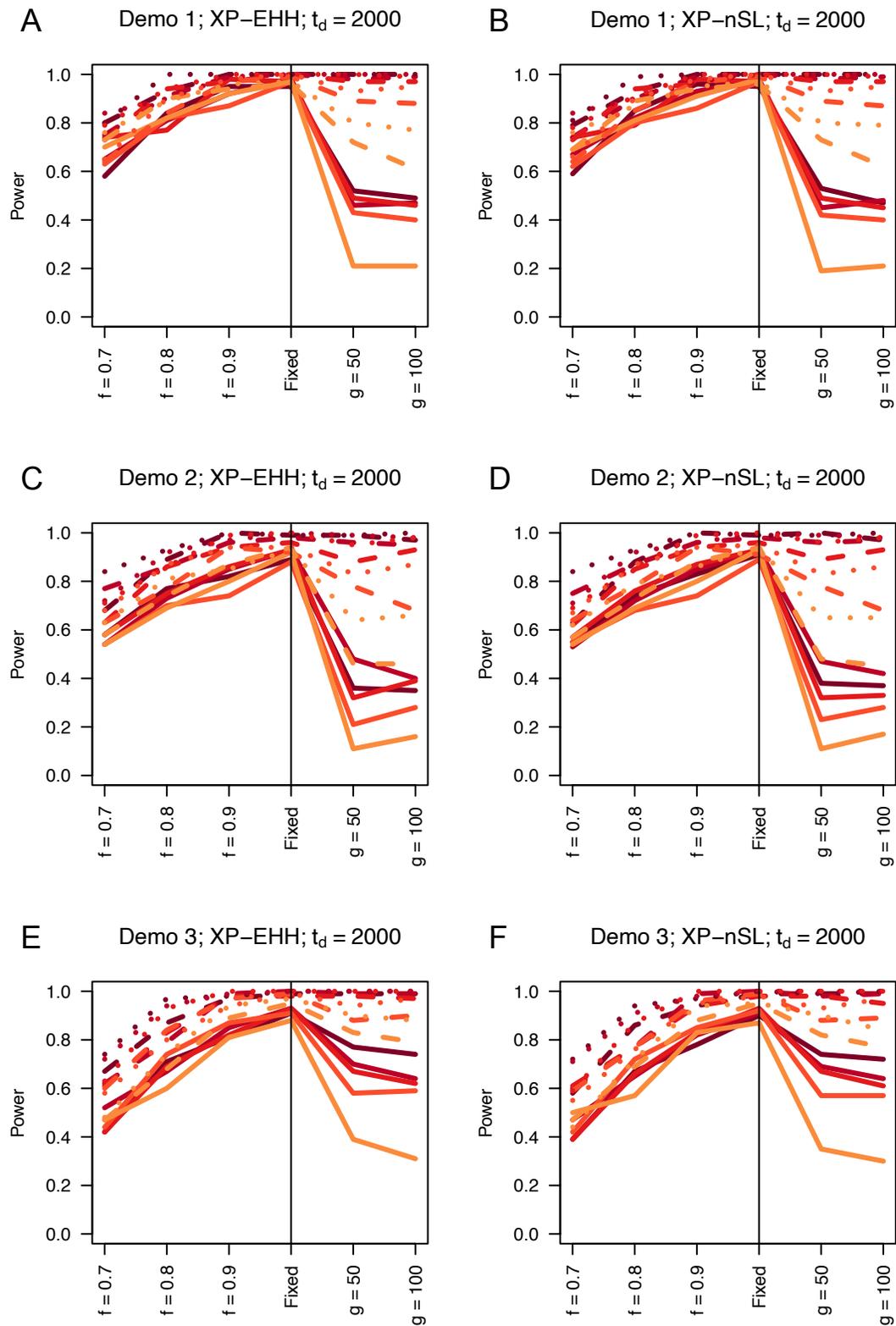
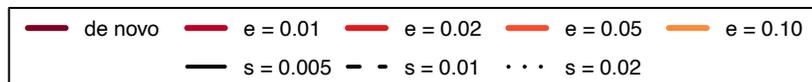


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**Table S54.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 20$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.

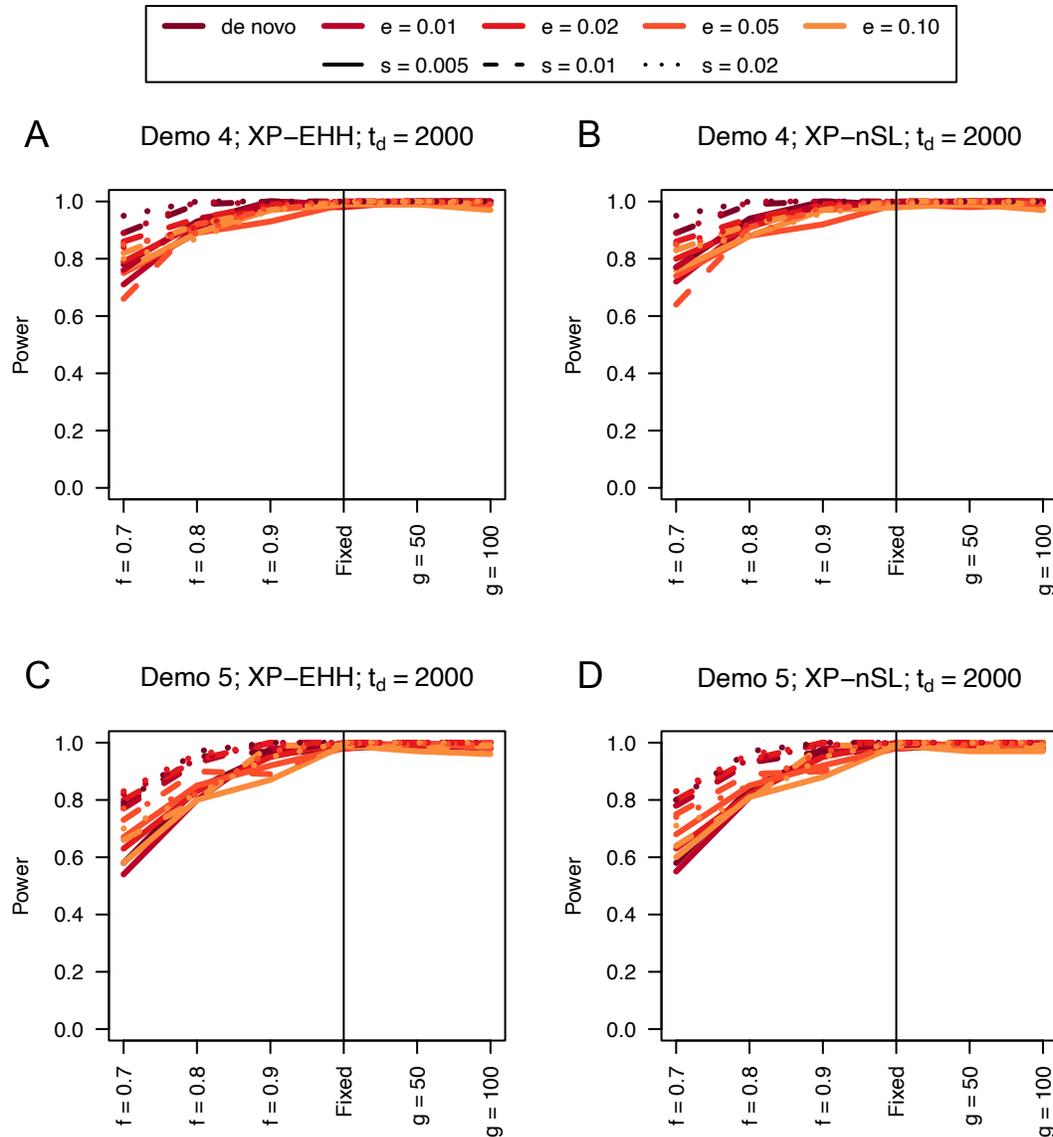


606 **Figure S55.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
607 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$   
608 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
609 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
610 selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



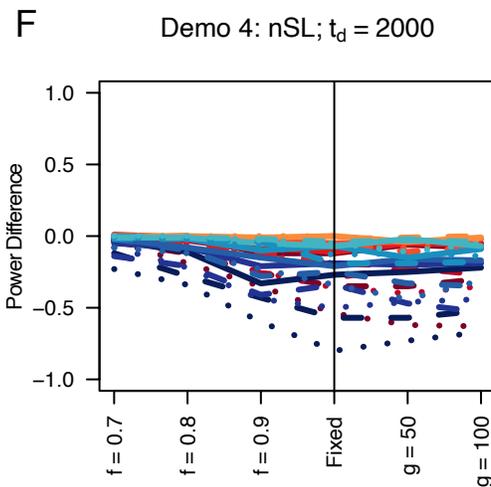
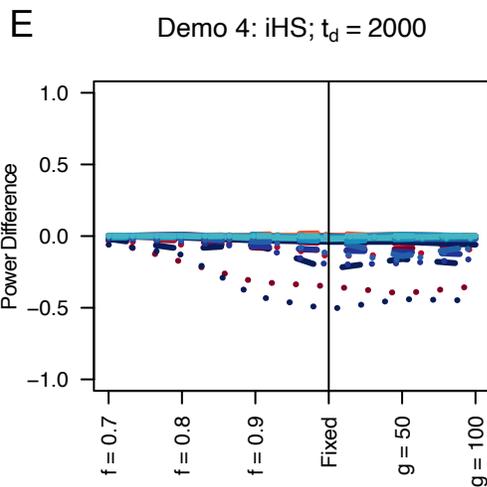
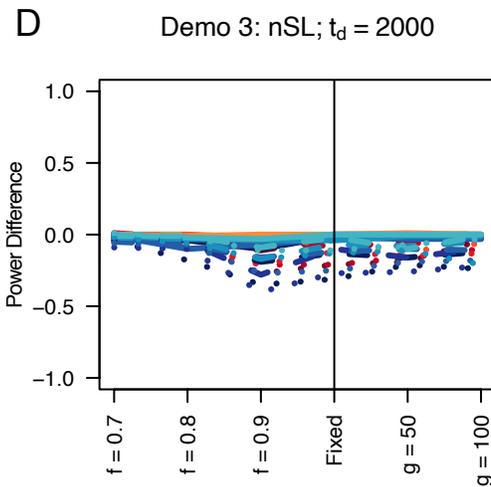
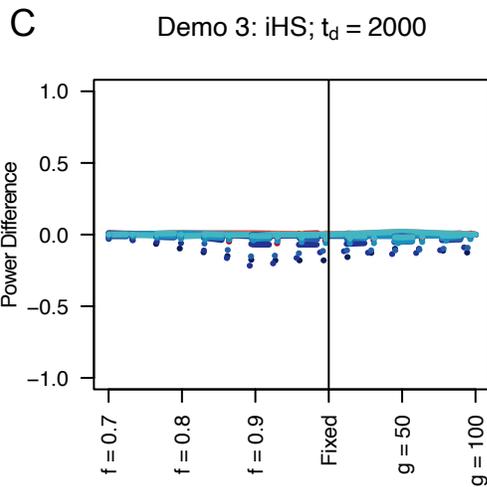
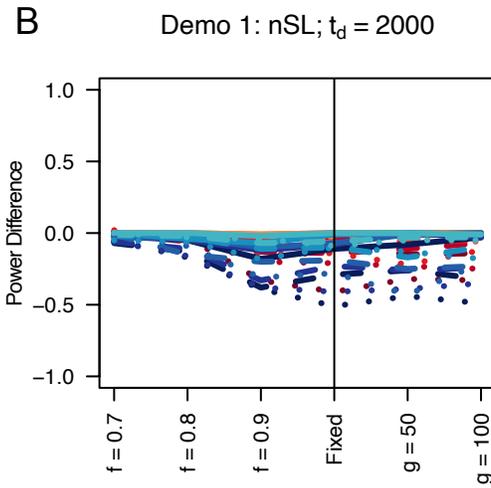
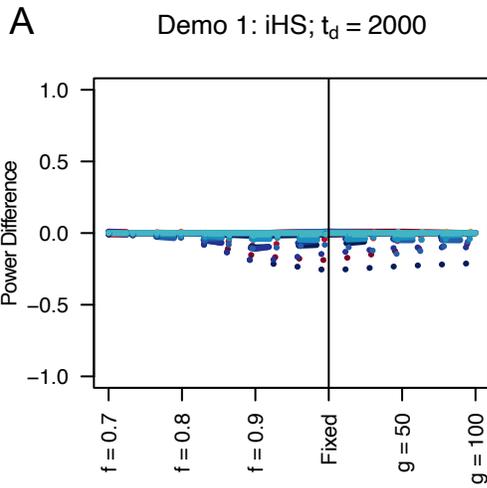
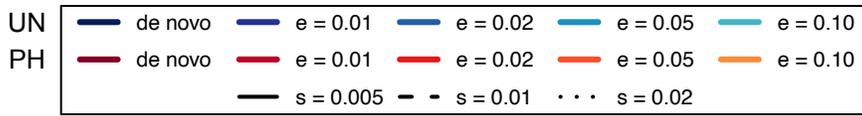
612 **Figure S56.** Power curves for unphased implementations of XP-EHH (A, C, and E) and XP-nSL (B, D,  
613 and F) under demographic histories Demo 1 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n$   
614 = 10 diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the  
615 adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is  
616 the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two  
617 populations diverged.

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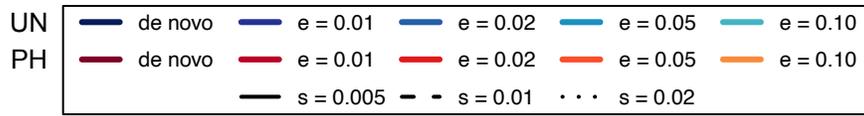


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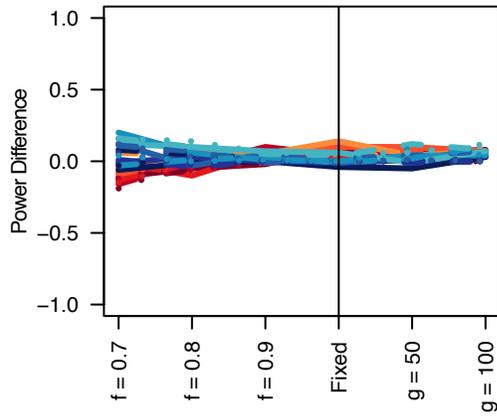
**Figure S57.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



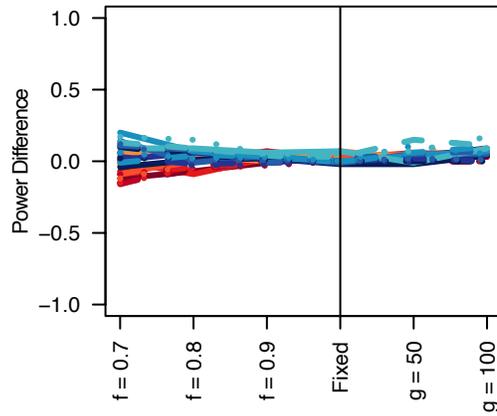
637 **Figure S58.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
638 and F) and phased implementations. Blue curves represent the power difference between the unphased  
639 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
640 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
641 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
642 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$  diploid samples.  $s$  is the selection coefficient,  $f$   
643 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
644 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in  
645 generations since the two populations diverged.



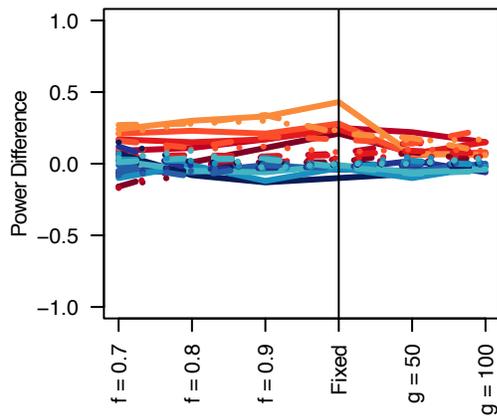
**A** Demo 1: XP-EHH;  $t_d = 2000$



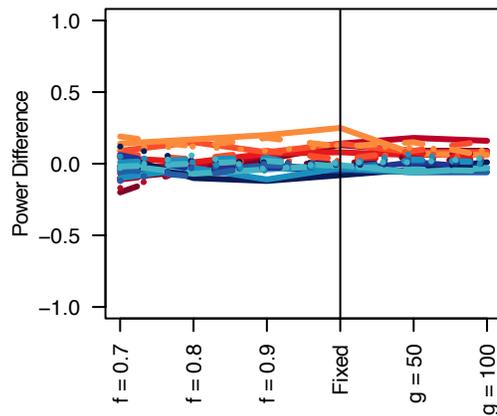
**B** Demo 1: XP-nSL;  $t_d = 2000$



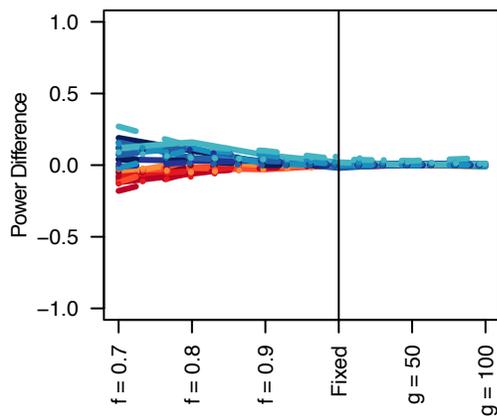
**C** Demo 2: XP-EHH;  $t_d = 2000$



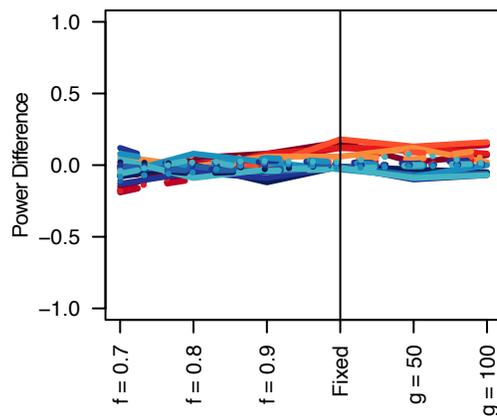
**D** Demo 2: XP-nSL;  $t_d = 2000$



**E** Demo 3: XP-EHH;  $t_d = 2000$

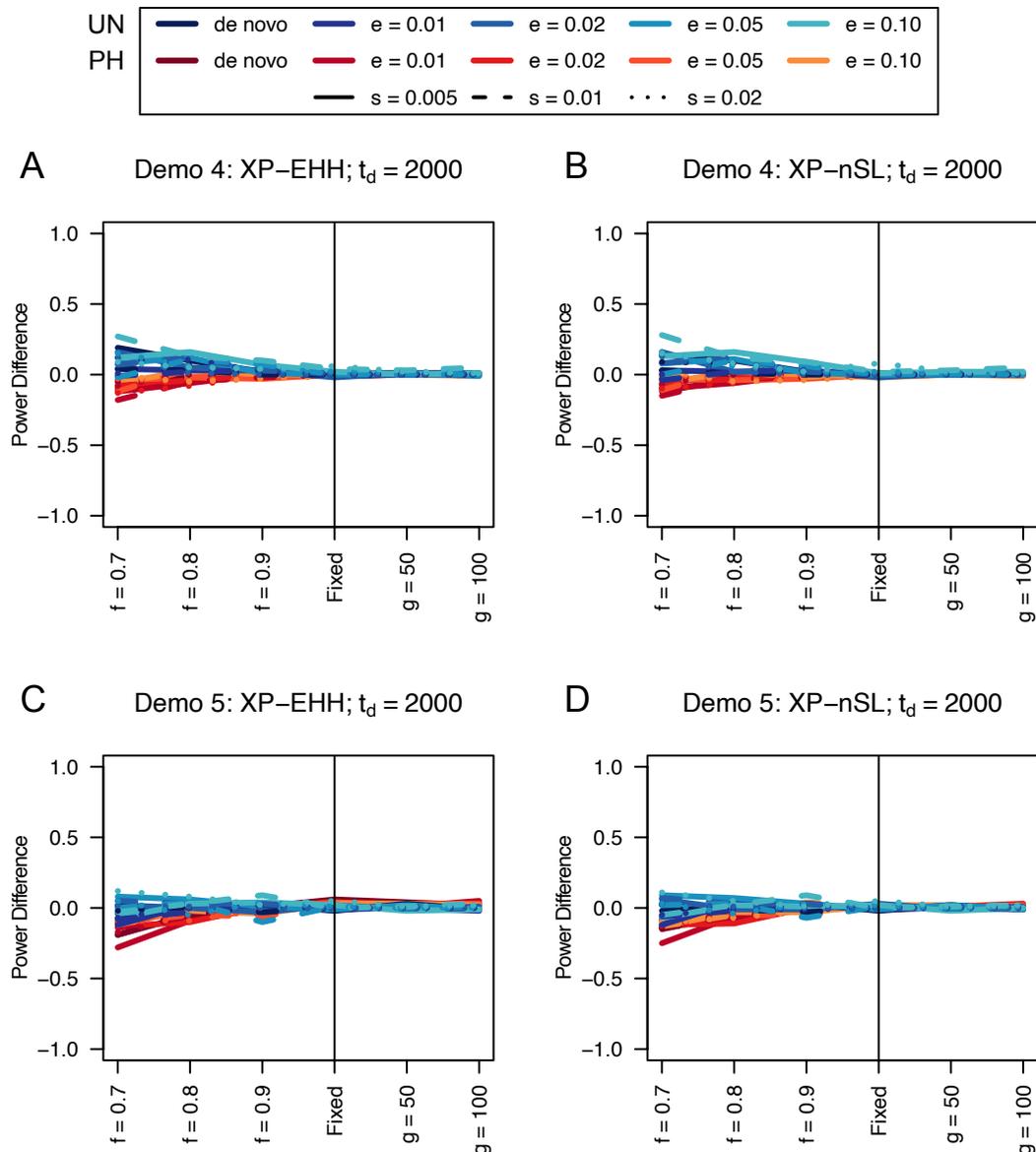


**F** Demo 3: XP-nSL;  $t_d = 2000$



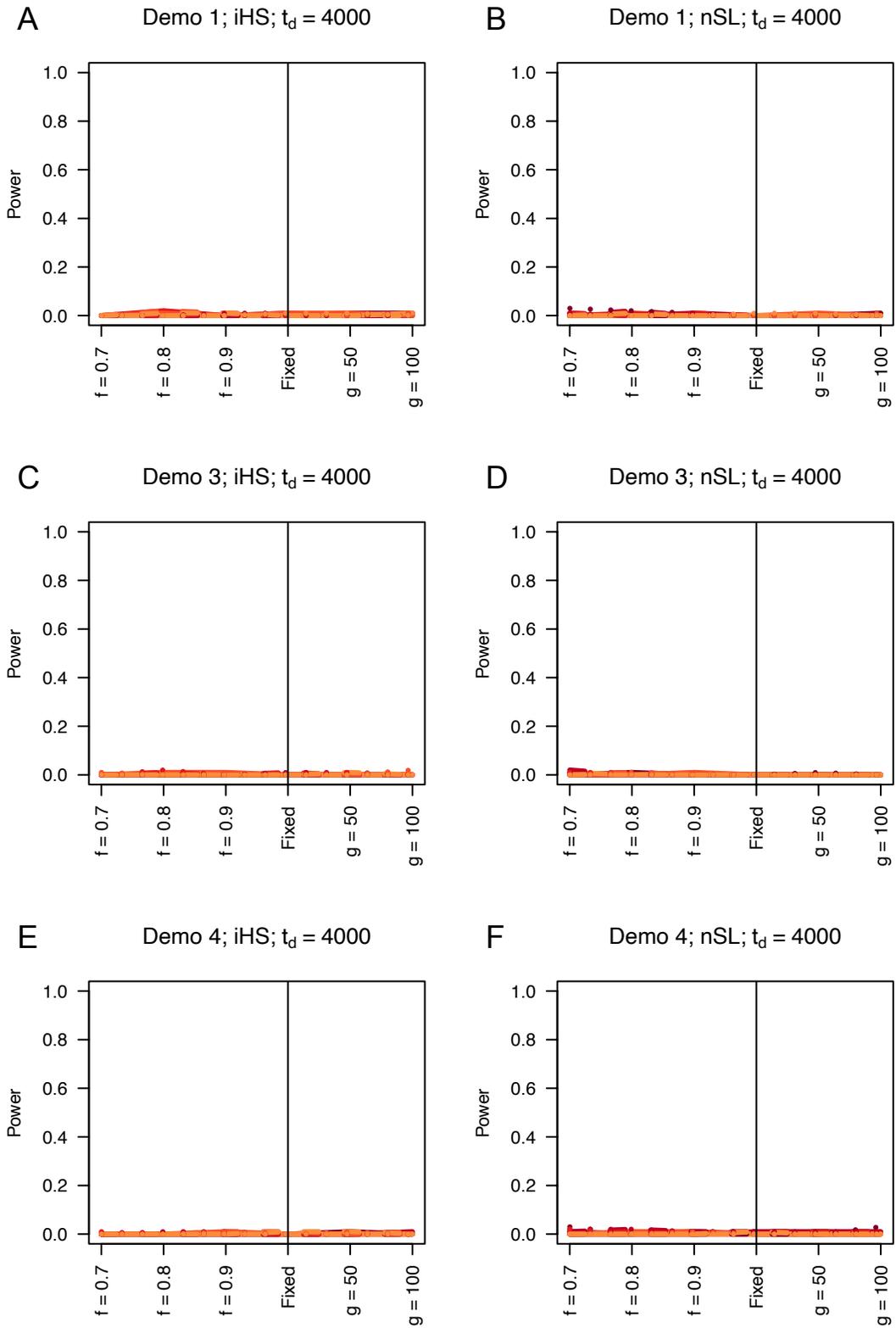
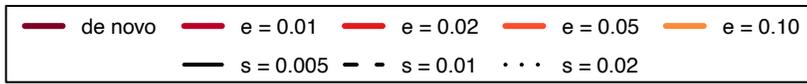
647 **Figure S59.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
648 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
649 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
650 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
651 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
652 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 10$  diploid samples from each population.  $s$   
653 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
654 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
655 2000 is the time in generations since the two populations diverged.

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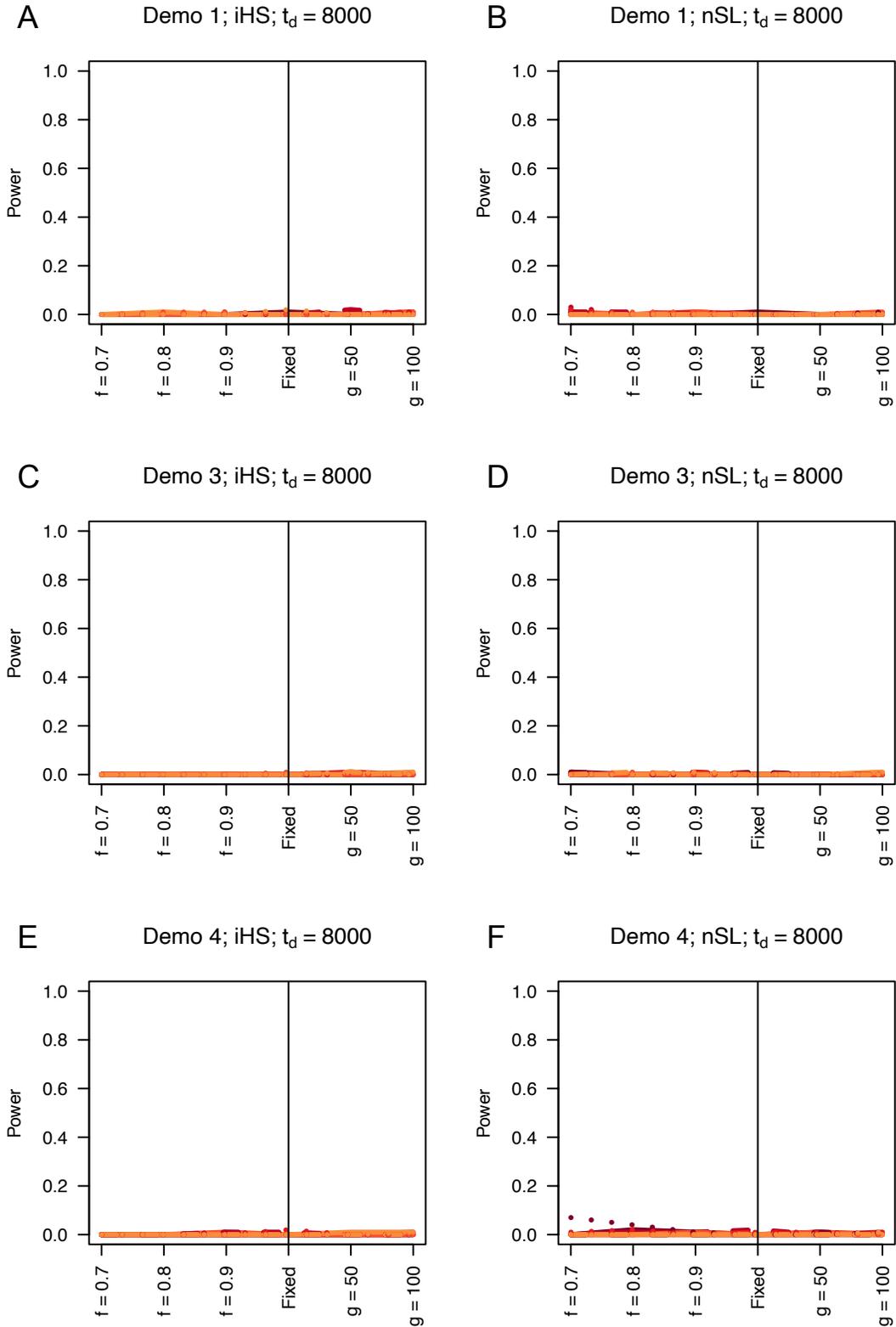
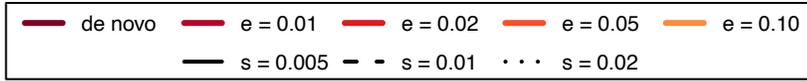


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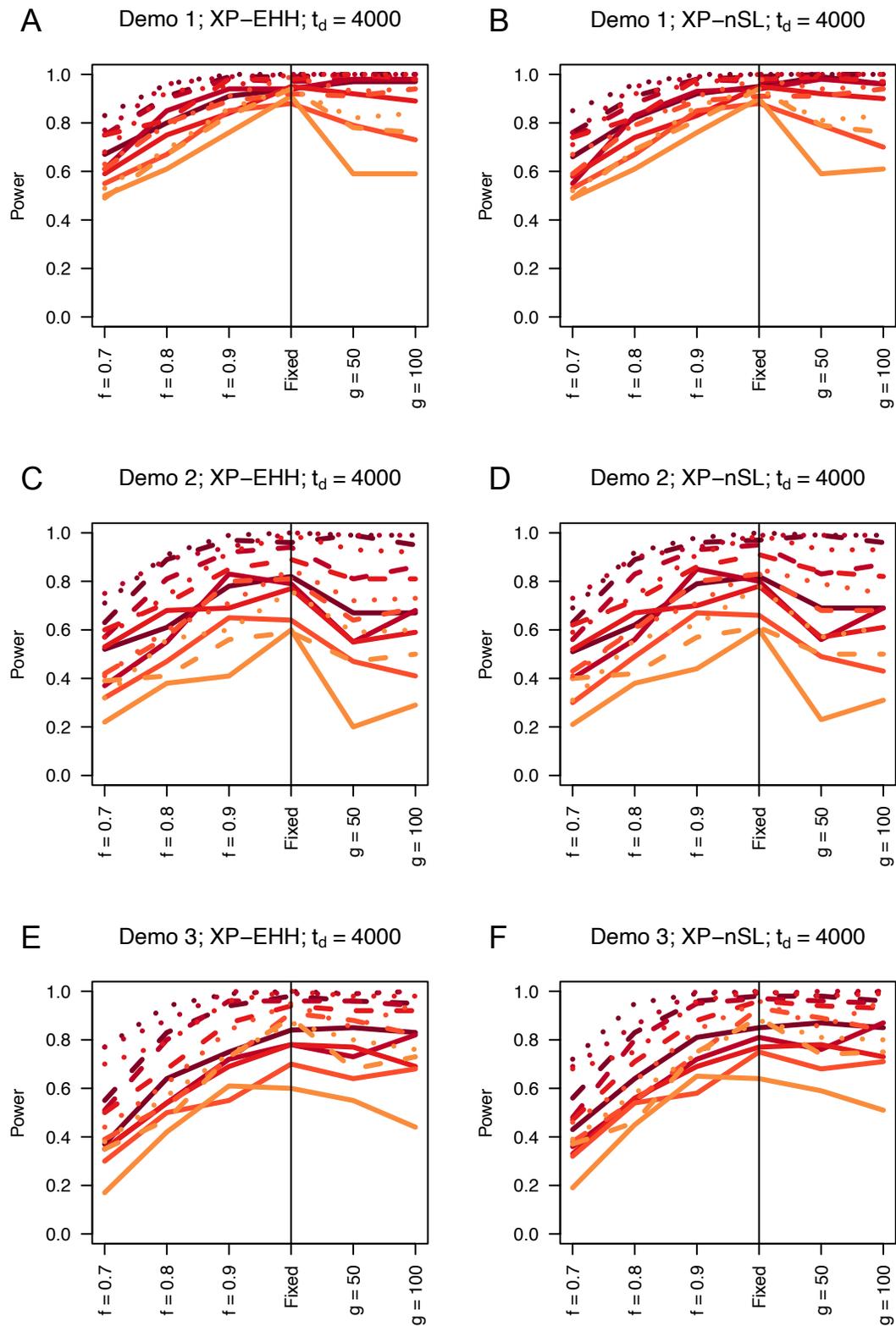
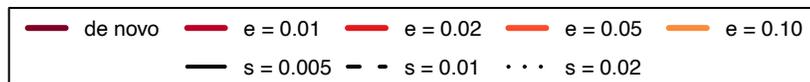
**Figure S60.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 2000$  is the time in generations since the two populations diverged.



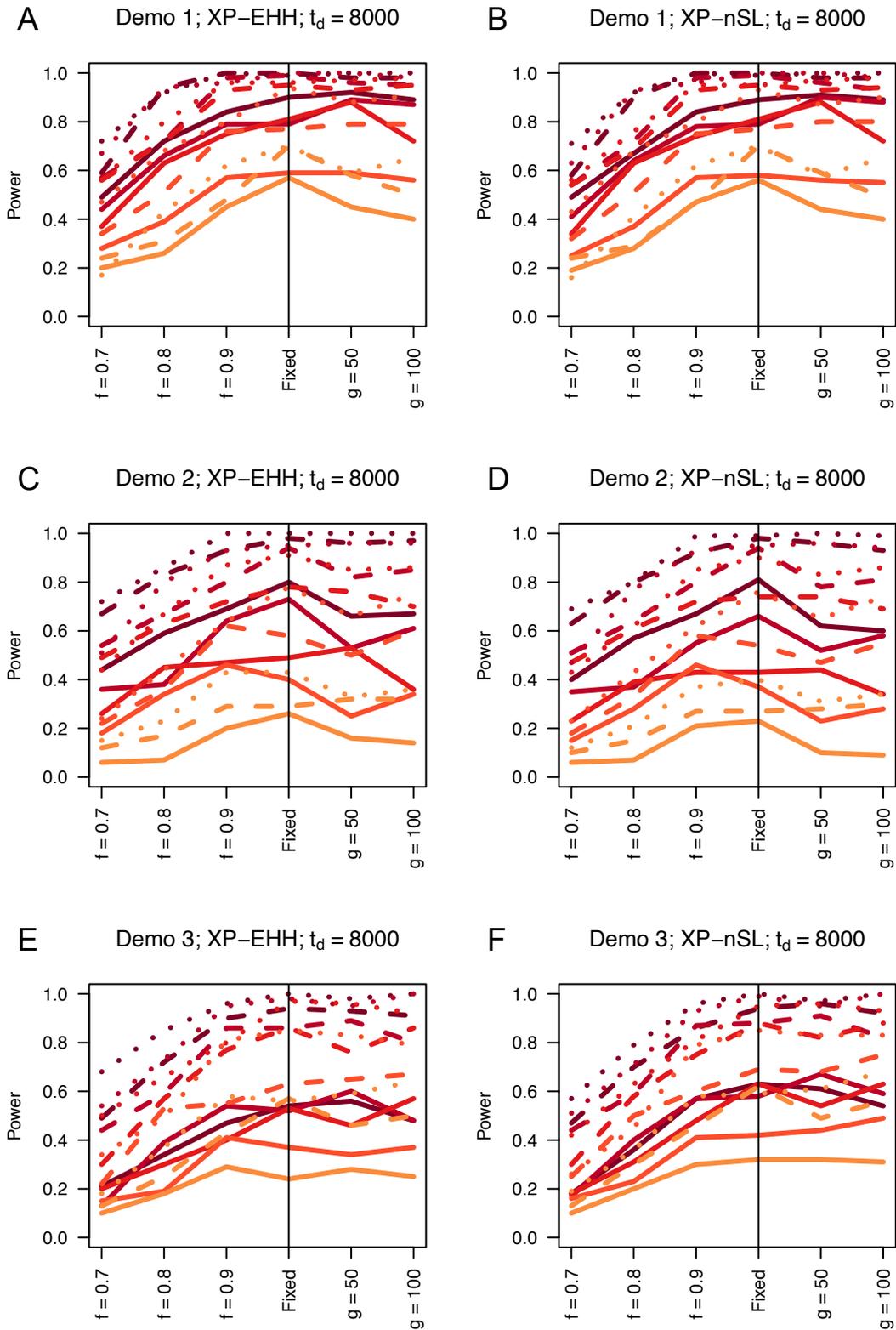
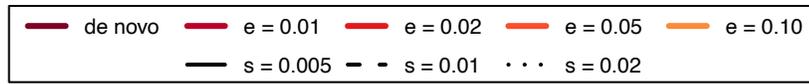
675 **Figure S61.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
676 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$   
677 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
678 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
679 selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



681 **Figure S62.** Power curves for unphased implementations of iHS (A, C, and E) and nSL (B, D, and F)  
682 under demographic histories Demo 1 (A and B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$   
683 diploid samples.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
684 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
685 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.

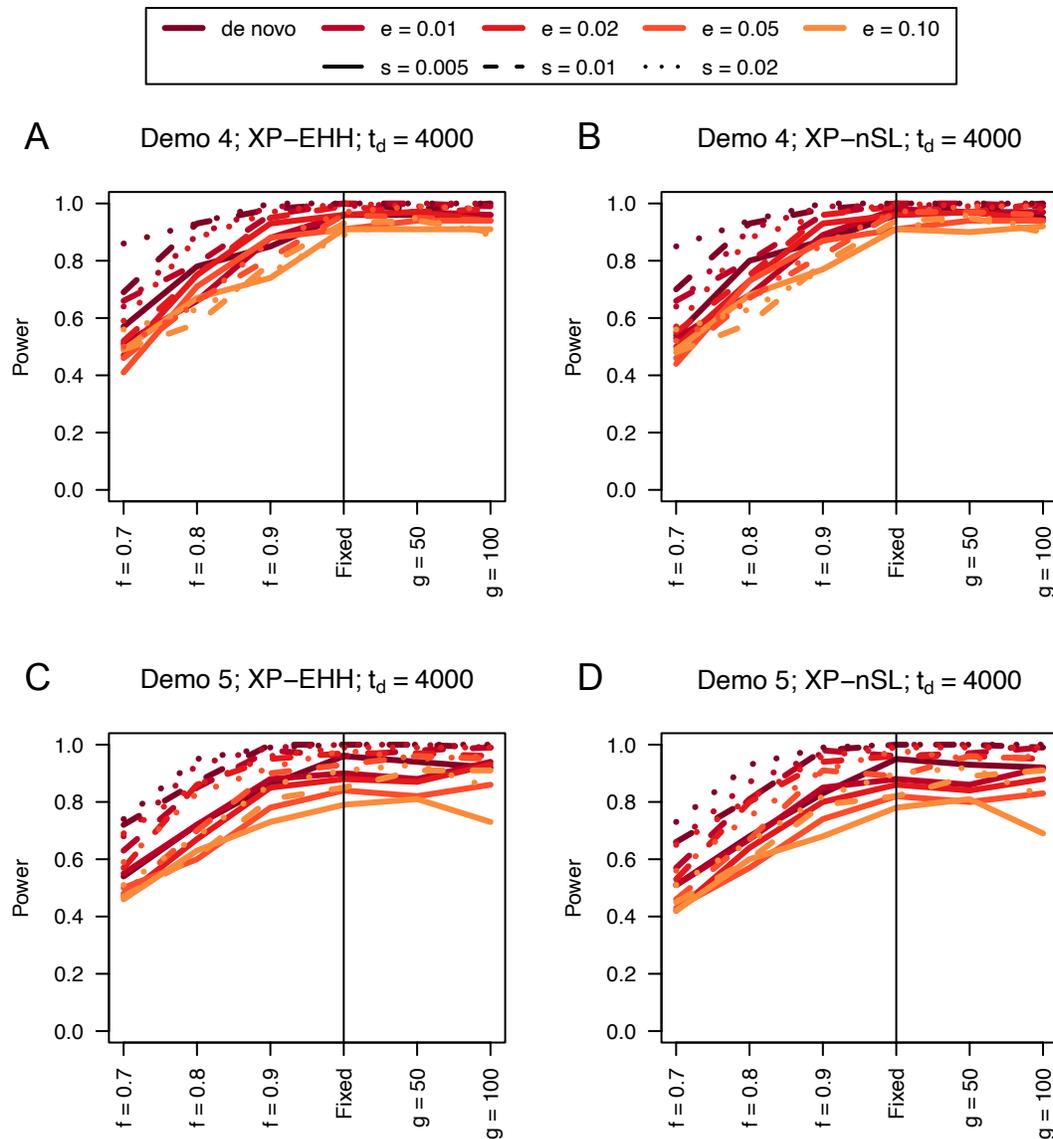


687 **Figure S63.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
688 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
689 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
690 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
691 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
692 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 10$  diploid samples from each population.  $s$   
693 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
694 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
695 4000 is the time in generations since the two populations diverged.

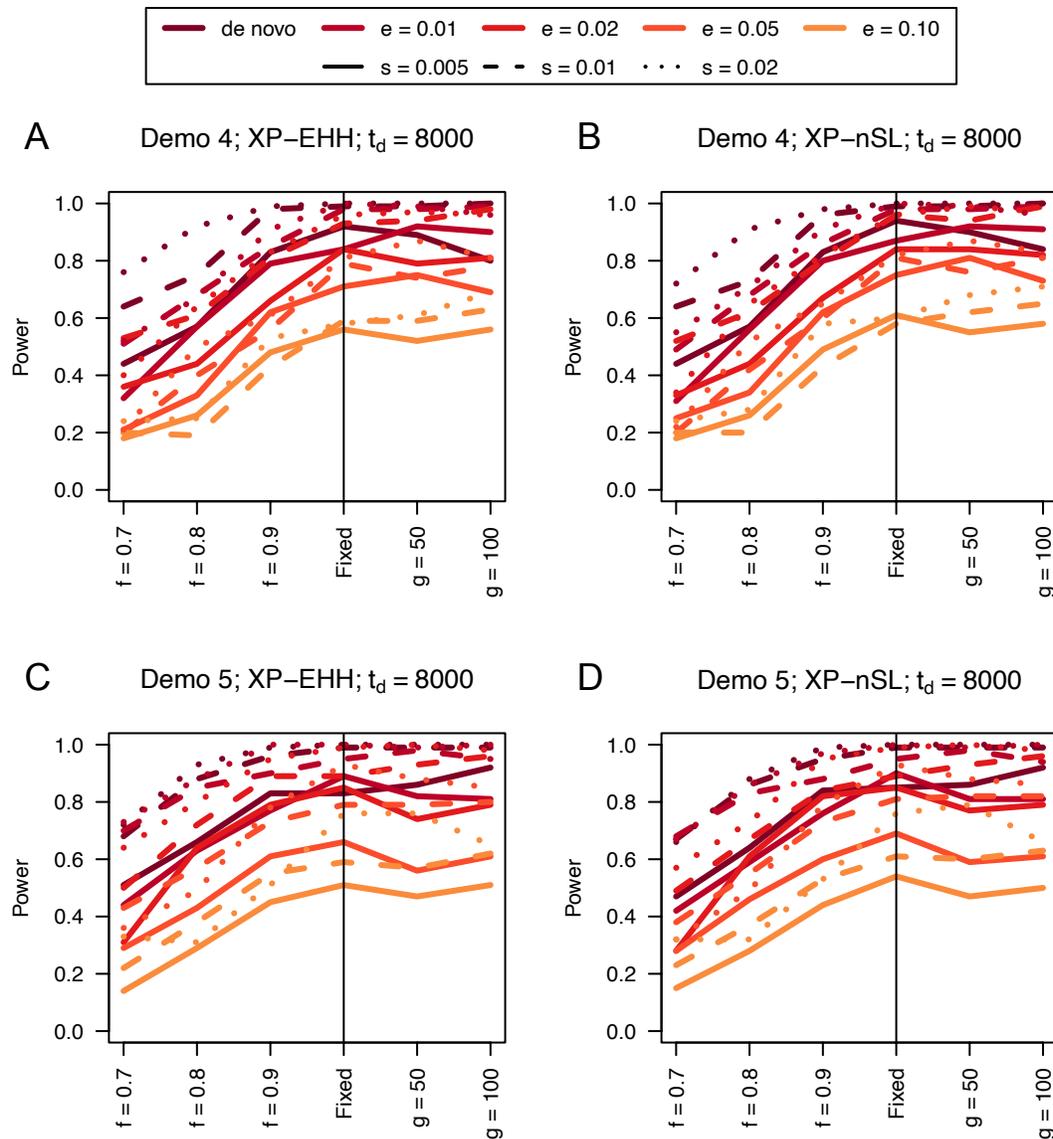


697 **Figure S64.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
698 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
699 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
700 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
701 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
702 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 10$  diploid samples from each population.  $s$   
703 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
704 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
705 8000 is the time in generations since the two populations diverged.

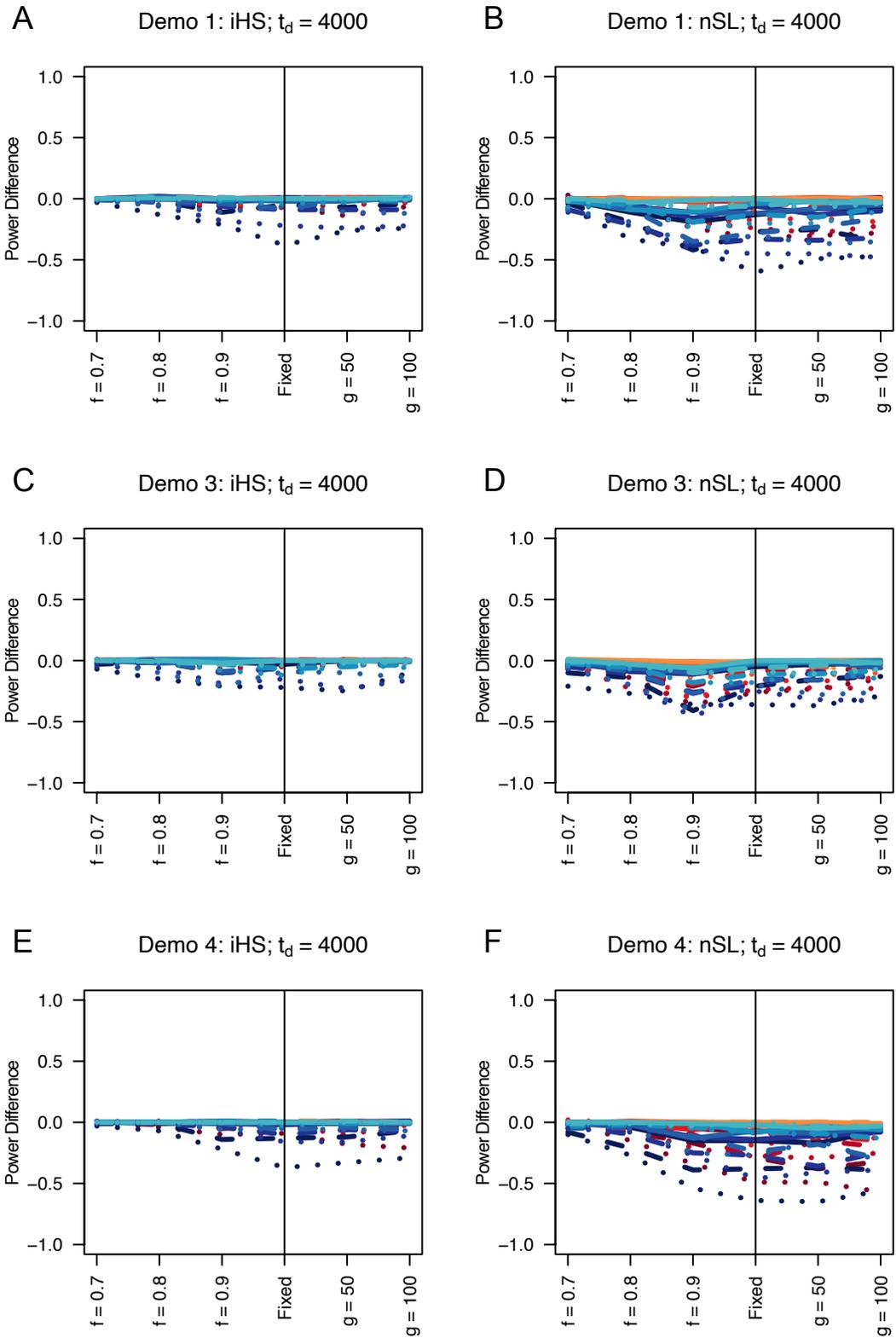
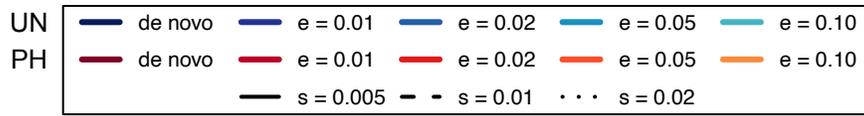
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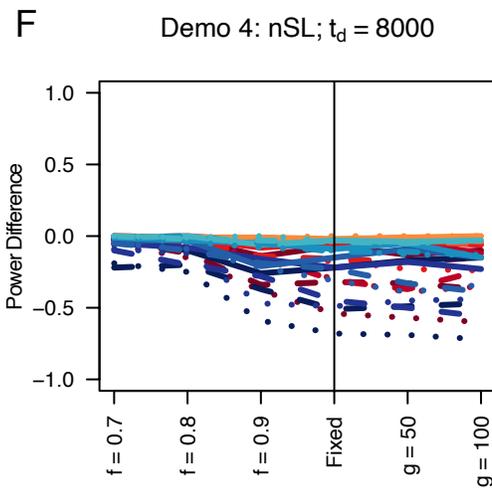
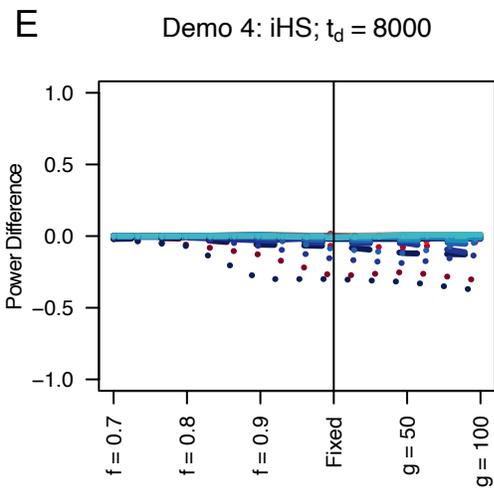
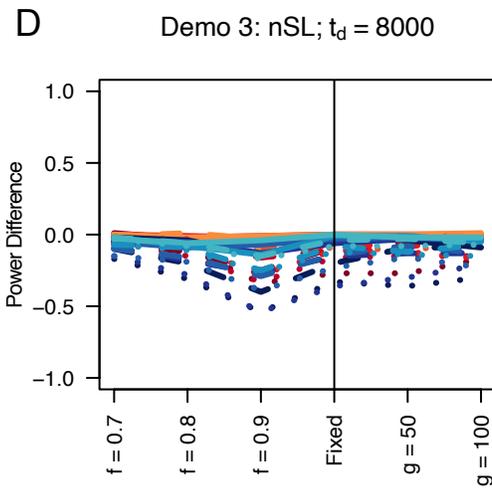
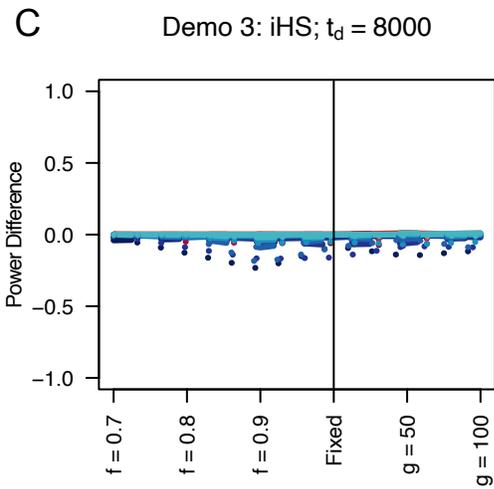
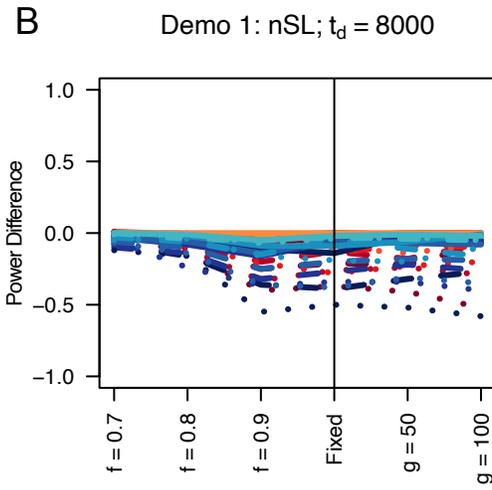
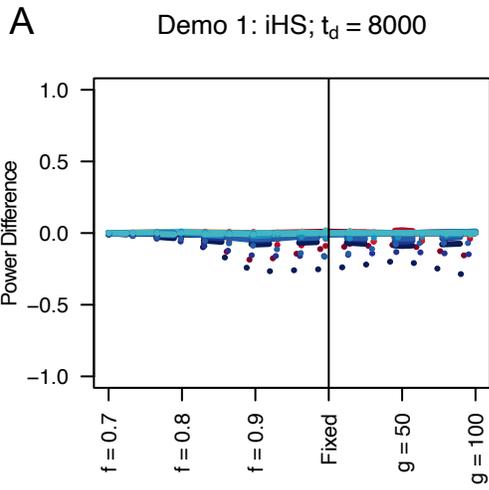
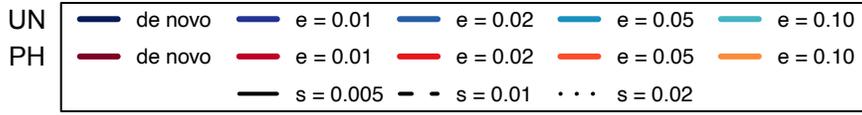
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 716 **Figure S65.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D)  
 717 under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from  
 718 each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
 719 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
 720 selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



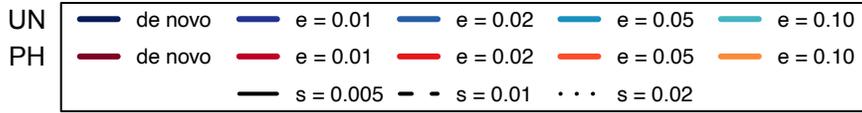
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 722 **Figure S66.** Power curves for unphased implementations of XP-EHH (A and C) and XP-nSL (B and D)  
 723 under demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from  
 724 each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of  
 725 sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which  
 726 selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.



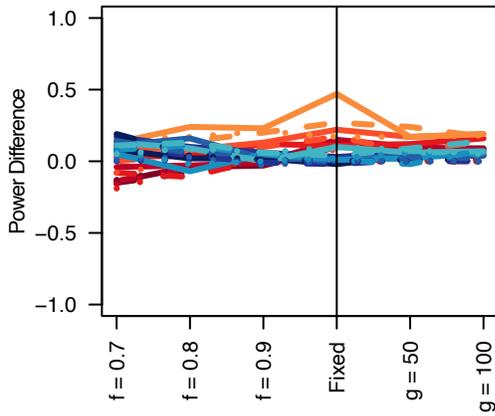
728 **Figure S67.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
729 and F) and phased implementations. Blue curves represent the power difference between the unphased  
730 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
731 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
732 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
733 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$  diploid samples.  $s$  is the selection coefficient,  $f$   
734 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
735 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in  
736 generations since the two populations diverged.



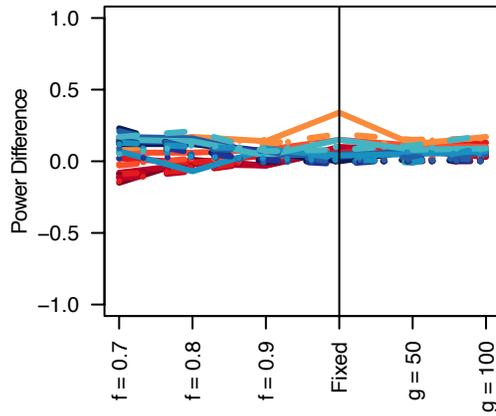
738 **Figure S68.** Power difference between unphased implementations of iHS (A, C, and E) and nSL (B, D,  
739 and F) and phased implementations. Blue curves represent the power difference between the unphased  
740 and phased statistics when applied to unphased data (UN). Red curves represent the power difference  
741 between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater  
742 than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1 (A and  
743 B), Demo 3 (C and D), and Demo 4 (E and F) with  $n = 10$  diploid samples.  $s$  is the selection coefficient,  $f$   
744 is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of  
745 sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in  
746 generations since the two populations diverged.



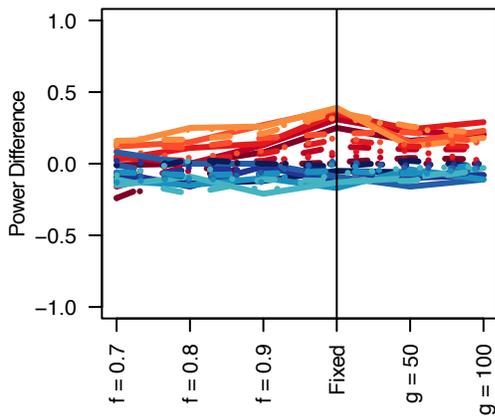
**A** Demo 1: XP-EHH;  $t_d = 4000$



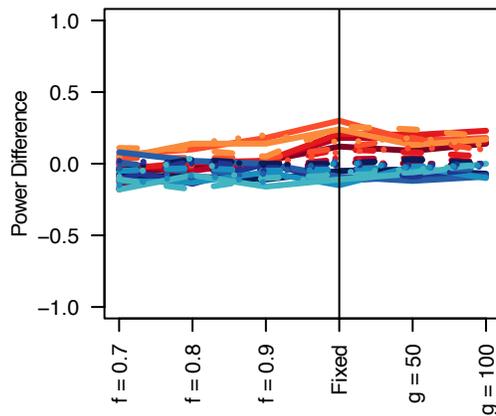
**B** Demo 1: XP-nSL;  $t_d = 4000$



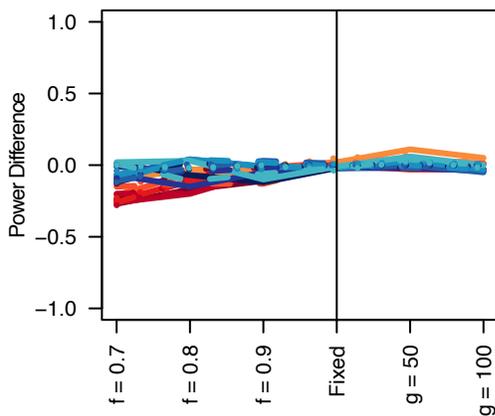
**C** Demo 2: XP-EHH;  $t_d = 4000$



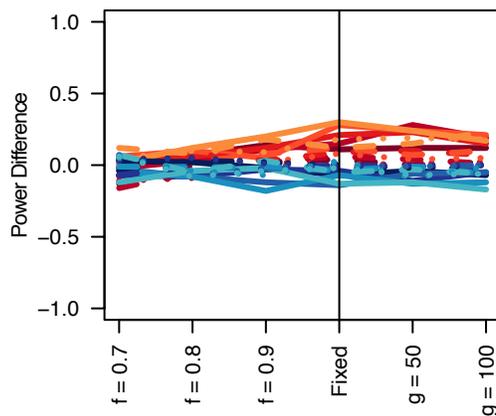
**D** Demo 2: XP-nSL;  $t_d = 4000$



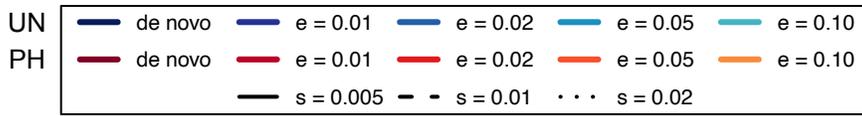
**E** Demo 3: XP-EHH;  $t_d = 4000$



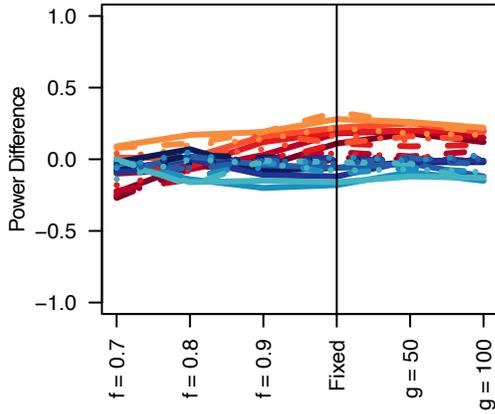
**F** Demo 3: XP-nSL;  $t_d = 4000$



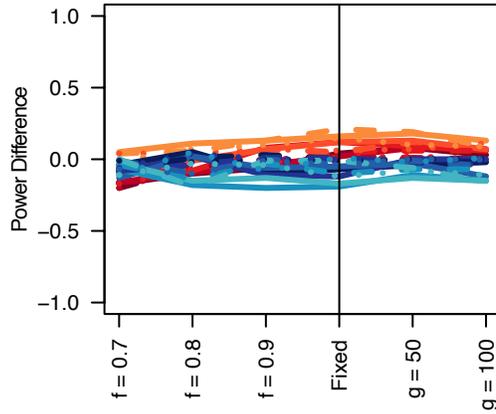
748 **Figure S69.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
749 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
750 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
751 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
752 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
753 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 10$  diploid samples from each population.  $s$   
754 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
755 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
756 4000 is the time in generations since the two populations diverged.



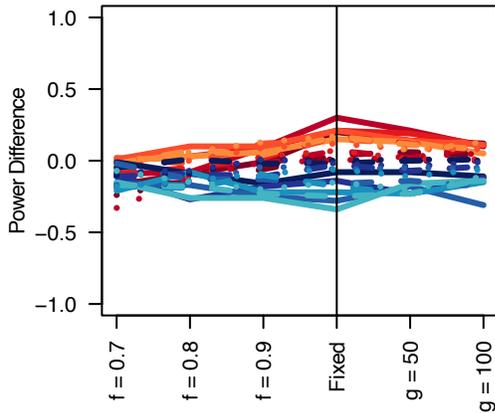
**A** Demo 1: XP-EHH;  $t_d = 8000$



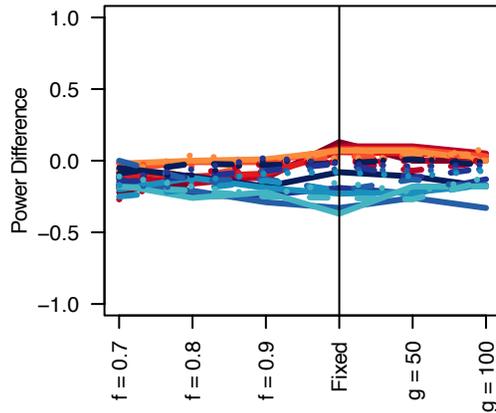
**B** Demo 1: XP-nSL;  $t_d = 8000$



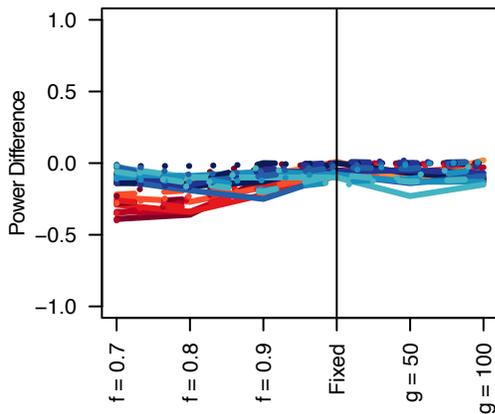
**C** Demo 2: XP-EHH;  $t_d = 8000$



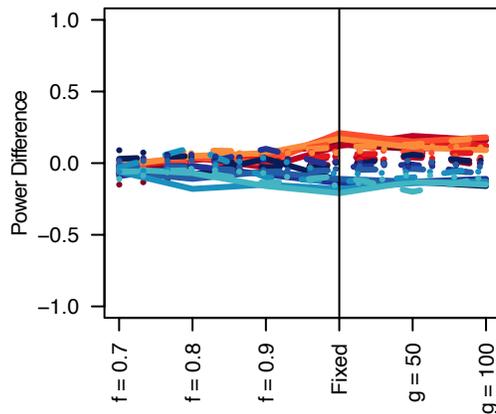
**D** Demo 2: XP-nSL;  $t_d = 8000$



**E** Demo 3: XP-EHH;  $t_d = 8000$

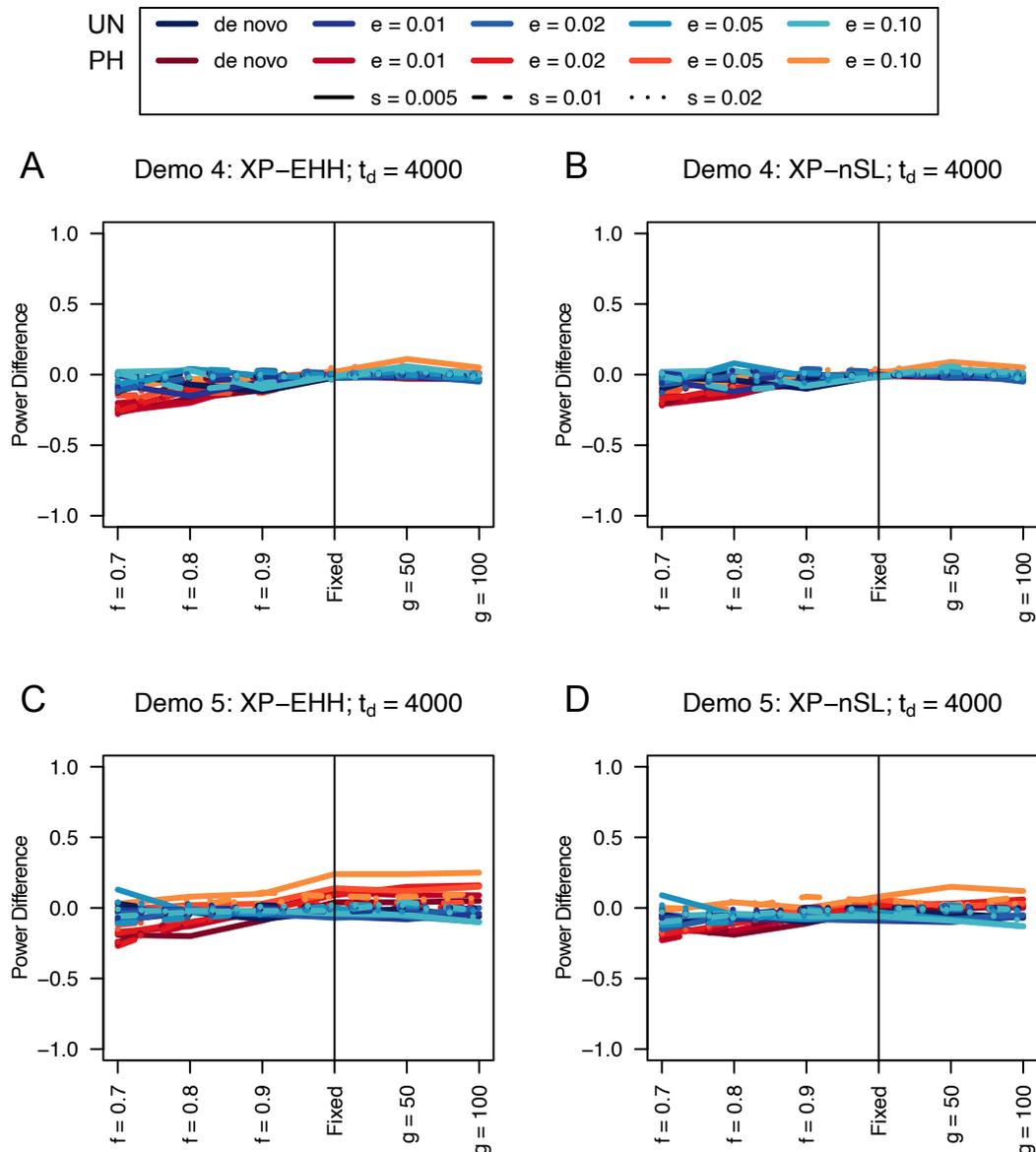


**F** Demo 3: XP-nSL;  $t_d = 8000$



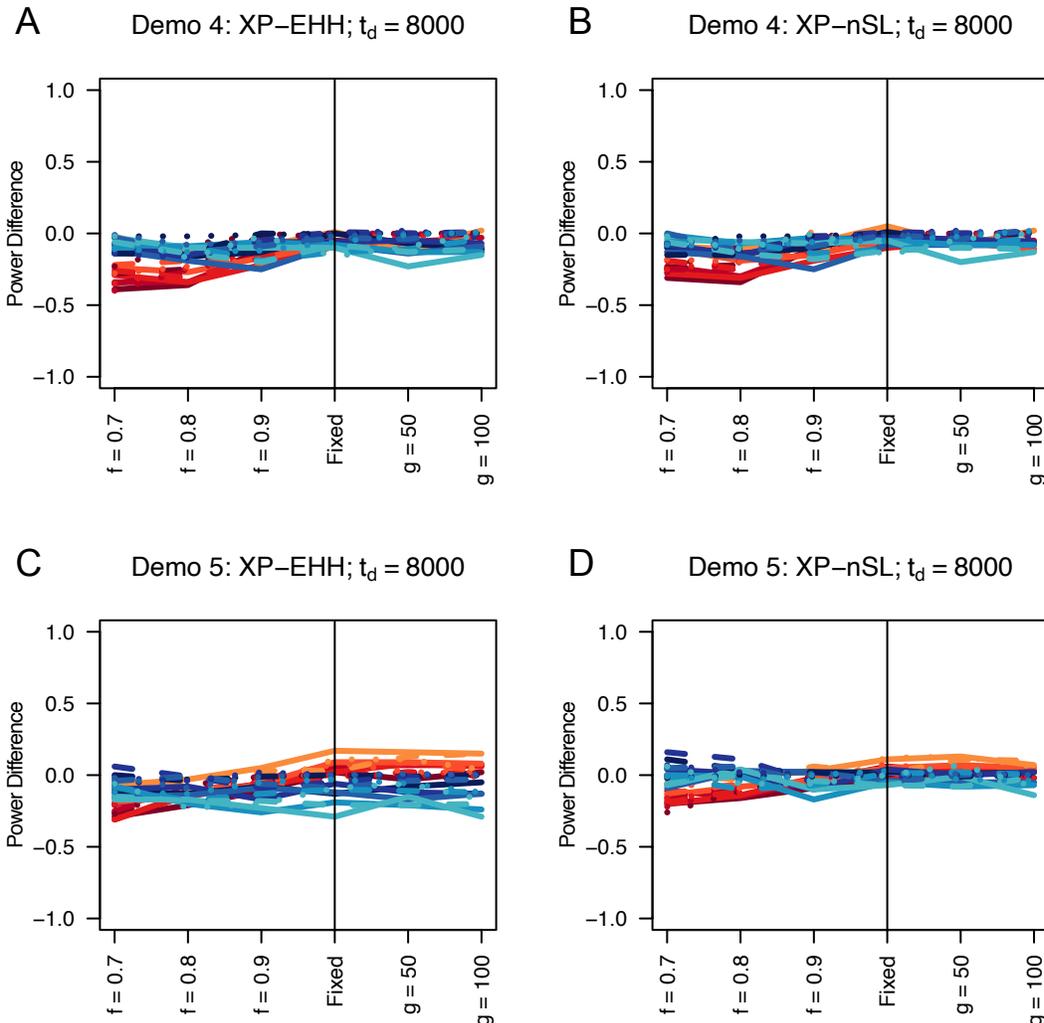
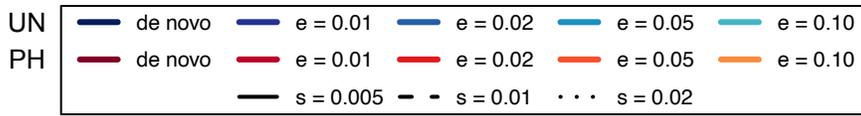
758 **Figure S70.** Power difference between unphased implementations of XP-EHH (A, C, and E) and XP-nSL  
759 (B, D, and F) and phased implementations. Blue curves represent the power difference between the  
760 unphased and phased statistics when applied to unphased data (UN). Red curves represent the power  
761 difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values  
762 greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 1  
763 (A and B), Demo 2 (C and D), and Demo 3 (E and F) with  $n = 10$  diploid samples from each population.  $s$   
764 is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number  
765 of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d =$   
766 8000 is the time in generations since the two populations diverged.

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**Figure S71.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 4000$  is the time in generations since the two populations diverged.



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**Table S72.** Power difference between unphased implementations of XP-EHH (A and C) and XP-nSL (B and D) and phased implementations. Blue curves represent the power difference between the unphased and phased statistics when applied to unphased data (UN). Red curves represent the power difference between the unphased and phased statistics when applied to perfectly phased data (PH). Values greater than 0 indicate the unphased statistic had higher power. Applied to demographic histories Demo 4 (A and B), and Demo 5 (C and D) with  $n = 10$  diploid samples from each population.  $s$  is the selection coefficient,  $f$  is the frequency of the adaptive allele at time of sampling,  $g$  is the number of generations at time of sampling since fixation,  $e$  is the frequency at which selection began, and  $t_d = 8000$  is the time in generations since the two populations diverged.