# **Supplemental Material**

CBE—Life Sciences Education

Barnes et al.

	Catholic (%)	Non-Catholic Christian (%)	No affiliation (%)	Other faith (%)	Total
White	985 (21)	1557 (34)	1754 (38)	306 (7)	4602
Black/African American	84 (15)	350 (62)	100 (18)	32 (6)	566
Hispanic	857 (55)	243 (16)	426 (27)	34 (2)	1560
Asian	212 (14)	173 (12)	634 (43)	445 (30)	1464
Multiracial	324 (26)	309 (25)	468 (38)	134 (11)	1235

Supplemental Table 1: Distribution of students along race/ethnicity and religious denomination

**Supplemental Table 2**: Number of students by region of the United States and racial/ethnic identity for which religiosity and acceptance of evolution was collected.

	West	Southwest	South	Southeast	Midwest	Northeast	Hawaii
White	344	1072	501	1903	272	465	45
Black	28	99	106	230	19	79	5
Hispanic	338	473	407	270	7	53	12
Asian	567	287	91	280	33	93	113
Multiracial	213	343	163	311	26	105	74
Total for region	1490	2274	1268	2994	357	795	249

**Supplemental Table 3:** Unweighted and Weighted mean squares item fit statistics (equal to outfit and infit MNSQ respectively) for partial credit Rasch models for microevolution, macroevolution, human evolution and religiosity scales. Values of 0.7- 1.3 are considered to indicate good fit. There were no values lower than 0.7 and values greater than 1.3 are underlined. Reverse scored items are indicated with an asterisk.

Scale	Items	Unweighted MNSQ	Weighted MNSQ
	ISEA 1	0.81	0.83
Macroevolution	ISEA 2*	<u>1.33</u>	1.23
acceptance	ISEA 3	0.80	0.80
	ISEA 4	0.98	0.99
	ISEA 5	0.86	0.88
	ISEA 6*	1.17	1.14
	ISEA 7	1.02	1.03
	ISEA 8	<u>1.33</u>	1.29
Microcyclution	ISEA 9*	1.15	1.11
Microevolution acceptance	ISEA 10	1.20	1.15
acceptance	ISEA 11	1.02	1.04
	ISEA 12*	0.97	0.97
	ISEA 13*	0.92	0.95
	ISEA 14	1.05	1.07
	ISEA 15*	0.94	0.97
	ISEA 16	1.01	1.06
Human evolution	ISEA 17	0.96	0.97
acceptance	ISEA 18*	1.10	1.11
acceptance	ISEA 19*	0.98	1.03
	ISEA 20	0.86	0.89
	ISEA 21	0.79	0.85
	ISEA 22*	0.98	1.05
	ISEA 23	0.85	0.88
	ISEA 24	<u>1.33</u>	<u>1.41</u>
Religiosity	REL 4	1.02	1.06
	REL 6	0.85	0.94
	REL 7	0.72	0.77
	REL 8	1.23	<u>1.30</u>

	Religiosity			Microe	volutio	on	Macroev	voluti		Human evolution		
							on					
Contra	estima	SE	P-	estima	SE	P-	estimat	SE	P-	estima	SE	P-
st	te		value	te		value	e		value	te		value
White -	-1.03	0.0	<.000	0.84	0.0	<.000	0.70	0.0	<.000	1.02	0.0	<.000
Black		9	1		8	1		7	1		9	1
White -	-0.28	0.0	<.000	0.44	0.0	<.000	0.22	0.0	<.000	0.41	0.0	<.000
Hispani		6	1		5	1		5	1		6	1
c												
White -	0.15	0.0	0.09	0.54	0.0	<.000	0.23	0.0	<.000	0.35	0.0	<.000
Asian		6			6	1		5	1		7	1
Black -	0.76	0.0	<.000	-0.40	0.0	<.000	-0.48	0.0	<.000	-0.61	0.1	<.000
Hispani		9	1		8	1		8	1		0	1
с												
Black -	1.18	0.1	<.000	-0.30	0.0	0.004	-0.47	0.0	<.000	-0.67	0.1	<.000
Asian		0	1		9			8	1		0	1
Hispani	0.42	0.0	<.000	0.10	0.0	0.368	0.01	0.0	1.000	-0.06	0.0	0.882
c -		7	1		6			6			8	
Asian												

**Supplemental Table 4:** Post-hoc comparisons of religiosity and evolution acceptance by race/ethnicity using the Tukey method.

Supplemental Table 5: Parameter estimates from linear mixed models for evolution acceptance among college students with an interaction between race/ethnicity and religiosity as a predictor. Bolded numbers indicate p<0.05.

		roevol			roevo				olution
Predictor	Slope	c <b>epta</b> i SE	p-	Slope	c <b>cepta</b> SE	p-	Slope	scepta SE	p-value
redictor	Slope	JL	value	Slope	JL	value	Slope	JL	pvalue
(Intercept)	0.36	0.16	0.029	0.36	0.14	0.011	0.31	0.15	0.046
Religiosity	-0.40	0.03	<0.001	-0.54	0.03	<0.001	-0.77	0.03	<0.001
Age	0.04	0.02	0.023	0.03	0.02	0.055	0.09	0.02	<0.001
Gender: male	-0.08	0.04	0.038	0.13	0.03	<0.001	0.15	0.04	0.001
Race/ethnicity:	(ref. W	hite)							
Black	-0.59	0.08	<0.001	-0.32	0.07	<0.001	-0.40	0.09	<0.001
Hispanic	-0.24	0.06	<0.001	-0.09	0.05	0.063	-0.20	0.06	0.001
Asian	-0.60	0.06	<0.001	-0.34	0.05	<0.001	-0.51	0.06	<0.001
Interactions:									
Religiosity x Black	0.27	0.08	0.001	0.24	0.07	0.001	0.22	0.09	0.012
Religiosity x Hispanic	0.17	0.05	0.002	0.24	0.05	<0.001	0.24	0.06	<0.001
Religiosity x Asian	0.17	0.05	0.001	0.27	0.04	<0.001	0.36	0.06	<0.001
Religious affiliation:	(ref. No	o affilia	ition)						
Other faith	-0.20	0.07	0.005	-0.12	0.06	0.051	-0.11	0.08	0.167
Catholic	-0.40	0.06	<0.001	-0.30	0.05	<0.001	-0.38	0.06	<0.001
Non-Catholic Christian	-0.62	0.06	<0.001	-0.75	0.05	<0.001	-1.09	0.07	<0.001
Parent education:	(ref. <ł	ligh scl	hool)						
High School	0.11	0.07	0.101	0.09	0.06	0.126	0.19	0.07	0.010
Bachelors'	0.23	0.06	<0.001	0.16	0.05	0.003	0.31	0.07	<0.001
Masters'	0.30	0.07	<0.001	0.26	0.06	<0.001	0.46	0.07	<0.001
>Masters'	0.42	0.07	<0.001	0.39	0.07	<0.001	0.51	0.08	<0.001
Region:	(ref. W	est)							
Southwest	-0.36	0.17	0.035	-0.26	0.15	0.070	-0.24	0.15	0.125
South	-0.41	0.19	0.028	-0.41	0.16	0.012	-0.46	0.17	0.009
Southeast	0.11	0.17	0.539	-0.07	0.15	0.654	-0.01	0.15	0.959
Midwest	-0.46	0.24	0.057	-0.63	0.20	0.003	-0.43	0.22	0.052

Northeast	0.03	0.23	0.894	0.10	0.19	0.608	0.27	0.21	0.191
Hawaii	0.10	0.40	0.799	0.00	0.34	0.993	-0.02	0.35	0.961

**Supplemental Table 6:** Parameter estimates from linear mixed models for evolution acceptance among college students with an interaction between race/ethnicity and religious affiliation as a predictor. Bolded numbers indicate p<0.05. Reference groups same as Supplemental Table 4.

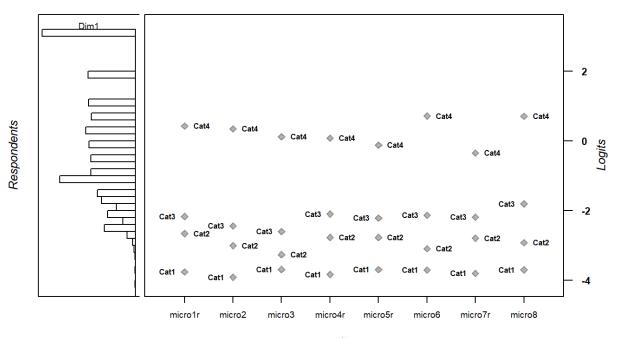
	Microevolution acceptance				croevo ccepta		Human evolution acceptance		
Predictor	Slope	SE	P-value	Slope	SE	P-value	Slope	SE	P-value
(Intercept)	0.59	0.17	0.001	0.55	0.15	<0.001	0.48	0.16	0.004
Religiosity	-0.32	0.03	<0.001	-0.45	0.02	<0.001	-0.68	0.03	<0.001
Age	0.04	0.02	0.039	0.03	0.02	0.082	0.08	0.02	<0.001
Gender: male	-0.07	0.04	0.072	0.14	0.04	<0.001	0.16	0.05	<0.001
Race/ethnicity:									
Black	-0.93	0.16	<0.001	-0.60	0.15	<0.001	-0.65	0.18	<0.001
Hispanic	-0.46	0.09	<0.001	-0.26	0.08	0.001	-0.38	0.10	<0.001
Asian	-0.99	0.08	<0.001	-0.77	0.07	<0.001	-1.03	0.09	<0.001
Religious affiliation:									
Catholic	-0.62	0.07	<0.001	-0.47	0.06	<0.001	-0.61	0.08	<0.001
Non-Catholic Christian	-0.86	0.07	<0.001	-0.98	0.06	<0.001	-1.31	0.08	<0.001
Interactions:									
Black x Catholic	0.53	0.24	0.030	0.39	0.22	0.073	0.53	0.27	0.049
Hispanic x Catholic	0.25	0.11	0.030	0.17	0.10	0.088	0.27	0.13	0.036
Asian x Catholic	0.75	0.14	<0.001	0.70	0.13	<0.001	0.82	0.16	<0.001
Black x Non-Catholic									
Christian	0.61	0.19	0.001	0.53	0.17	0.002	0.46	0.21	0.030
Hispanic x Non-Catholic									
Christian	0.36	0.14	0.011	0.38	0.12	0.002	0.23	0.16	0.143
Asian x Non-Catholic	0.00	0.45	0.000	0.00	0.10	10.001	0.74	0.10	10.001
Christian	0.60	0.15	0.000	0.69	0.13	<0.001	0.74	0.16	<0.001
Parent education:	0.02	0.07	0.624	0.04	0.00	0 5 0 0	0.1.4	0.00	0.074
High School	0.03	0.07	0.621	0.04	0.06	0.508	0.14	0.08	0.074
Bachelors'	0.17	0.07	0.010	0.12	0.06	0.035	0.29	0.07	<0.001
Masters'	0.23	0.07	0.001	0.20	0.06	0.001	0.40	0.08	<0.001
>Masters'	0.35	0.08	<0.001	0.36	0.07	<0.001	0.51	0.09	<0.001
Region:				0.00	0.45	0.000	0.04	0.47	0.400
Southwest	-0.37	0.18	0.040	-0.28	0.15	0.068	-0.21	0.17	0.196
South	-0.45	0.20	0.022	-0.43	0.17	0.011	-0.45	0.19	0.015
Southeast	0.07	0.18	0.693	-0.11	0.15	0.467	-0.04	0.17	0.805
Midwest	-0.53	0.25	0.034	-0.69	0.21	0.002	-0.49	0.23	0.036
Northeast	0.03	0.24	0.891	0.11	0.21	0.587	0.35	0.22	0.118
Hawaii	0.09	0.42	0.821	-0.01	0.35	0.984	-0.02	0.37	0.967

**Supplemental Table 7**: Full results from the moderated mediation analyses using 1000 quasi-Bayesian Monte Carlo simulations to calculate confidence intervals and statistical significance. Mediation effect indicates the effect of racial/ethnic identity on evolution acceptance mediated by religiosity after controlling for religious affiliation. Direct effect indicates the effect of racial/identity on evolution acceptance not related to religiosity. Proportion mediated shows the proportion of total effect of racial/ethnic identity on evolution acceptance that can be attributed to religiosity. Bolded estimates indicate p<0.05.

		Black/African American and White students									
		C	atholic		Non-Cat	holic Chr	istian	No	affiliation	l	
			95%	95%		95%	95%		95%	95%	
			CI	CI		CI	CI		CI	CI	
		Estimate	lower	upper	Estimate	lower	upper	Estimate	lower	upper	
	Mediation										
Microevolution	effect	-0.05	-0.08	-0.03	-0.05	-0.08	-0.03	-0.05	-0.08	-0.03	
	Direct										
	effect	-0.48	-0.63	-0.35	-0.48	-0.62	-0.34	-0.49	-0.63	-0.34	
	Total										
	Effect	-0.54	-0.68	-0.41	-0.54	-0.68	-0.40	-0.54	-0.68	-0.39	
	Prop.										
	Mediated	0.10	0.06	0.16	0.10	0.06	0.16	0.10	0.06	0.15	
	Mediation										
Macroevolution	effect	-0.07	-0.10	-0.04	-0.07	-0.10	-0.05	-0.07	-0.10	-0.04	
	Direct										
	effect	-0.24	-0.37	-0.13	-0.24	-0.36	-0.11	-0.24	-0.37	-0.11	
	Total										
	Effect	-0.31	-0.44	-0.20	-0.31	-0.43	-0.18	-0.31	-0.45	-0.19	
	Prop.										
	Mediated	0.23	0.14	0.40	0.24	0.14	0.42	0.23	0.14	0.41	
Human	Mediation										
Evolution	effect	-0.11	-0.15	-0.07	-0.11	-0.16	-0.07	-0.11	-0.15	-0.07	
	Direct										
	effect	-0.34	-0.49	-0.18	-0.34	-0.51	-0.18	-0.34	-0.50	-0.17	
	Total										
	Effect	-0.45	-0.62	-0.28	-0.45	-0.62	-0.28	-0.45	-0.62	-0.27	
	Prop.										
	Mediated	0.24	0.15	0.39	0.24	0.15	0.40	0.24	0.15	0.41	
				ŀ	lispanic/Lat						
		C	atholic		Non-Cat	holic Chr	istian	Noa	affiliation	-	
			95%	95%		95%	95%			95%	
			CI	CI		CI	CI		95% CI	CI	
		Estimate	lower	upper	Estimate	lower	upper	Estimate	lower	upper	
Microevolution	Mediation	0.00	-0.02	0.02	0.00	-0.02	0.02	0.00	-0.02	0.01	

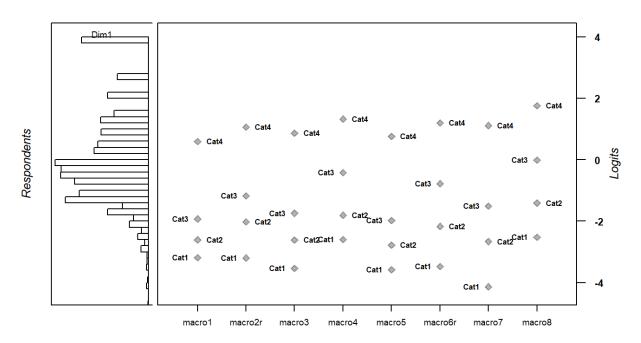
	effect									
	Direct									
	effect	-0.24	-0.33	-0.14	-0.25	-0.34	-0.16	-0.25	-0.33	-0.14
	Total									
	Effect	-0.24	-0.33	-0.14	-0.25	-0.35	-0.17	-0.25	-0.34	-0.13
	Prop.									
	Mediated	0.00	-0.08	0.06	0.00	-0.08	0.08	0.00	-0.06	0.07
	Mediation									
Macroevolution	effect	0.00	-0.02	0.02	0.00	-0.02	0.02	0.00	-0.02	0.02
	Direct									
	effect	-0.09	-0.18	-0.01	-0.09	-0.18	0.00	-0.09	-0.18	-0.01
	Total									
	Effect	-0.09	-0.19	0.00	-0.09	-0.19	0.00	-0.09	-0.17	-0.01
	Prop.									
	Mediated	0.01	-1.41	0.58	0.01	-0.47	2.25	0.03	-0.43	0.50
Human	Mediation									
Evolution	effect	0.00	-0.04	0.03	0.00	-0.03	0.03	0.00	-0.03	0.03
	Direct									
	effect	-0.20	-0.32	-0.07	-0.21	-0.32	-0.11	-0.21	-0.30	-0.09
	Total									
	Effect	-0.21	-0.33	-0.07	-0.21	-0.33	-0.10	-0.21	-0.32	-0.10
	Prop.									
	Mediated	0.03	-0.19	0.15	0.01	-0.18	0.14	0.01	-0.16	0.17

**Supplemental Figure 1** Wright map of acceptance of microevolution data. The data points on the right represent item difficulties and the histogram on the left shows the distribution of person abilities. Higher points and higher respondents indicate more difficult items, i.e. high evolution acceptance. Cat1 = "disagree", Cat2= "neutral", Cat3= "agree", Cat4= "strongly agree". Comparison of the histogram with the item difficulties shows that Rasch item difficulties are below most person abilities indicating that most students in our sample were accepting of microevolution.



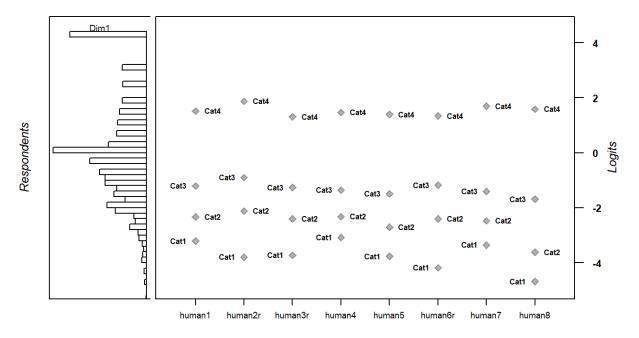
Items

**Supplemental Figure 2** Wright map of acceptance of macroevolution scale. The data points on the right represent item difficulties and the histogram on the left shows the distribution of person abilities. Higher points and higher respondents indicate more difficult items, i.e. high evolution acceptance. Cat1 = "disagree", Cat2= "neutral", Cat3= "agree", Cat4= "strongly agree". Comparison of the histogram with the item difficulties shows that Rasch item difficulties are below most person abilities indicating that most students in our sample were accepting of macroevolution.

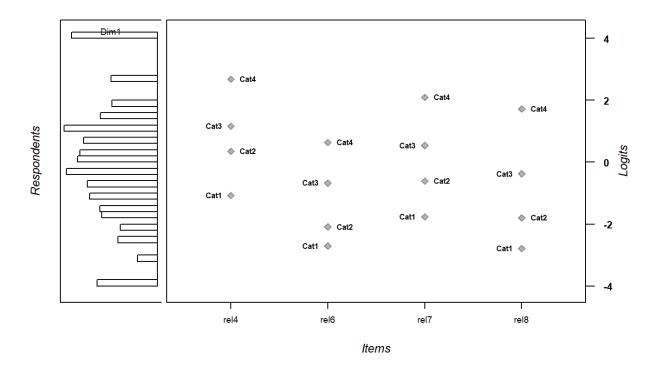


Items

**Supplemental Figure 3** Wright map of acceptance of human evolution scale. The data points on the right represent item difficulties and the histogram on the left shows the distribution of person abilities. Higher points and higher respondents indicate more difficult items, i.e. high evolution acceptance. Cat1 = "disagree", Cat2= "neutral", Cat3= "agree", Cat4= "strongly agree". Comparison of the histogram with the item difficulties shows many more person abilities below Cat3, i.e. the agree option, compared to the Wright maps for micro- and macroevolution. This suggests that fewer students in our sample were accepting of human evolution, compared to their acceptance of micro- and macroevolution.

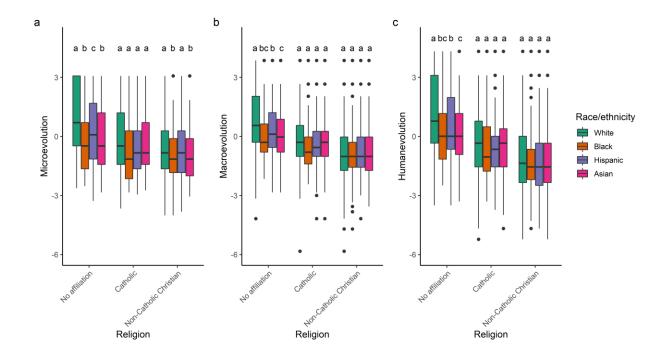


**Supplemental Figure 4** Wright map of religiosity scale. The data points on the right represent item difficulties and the histogram on the left shows the distribution of person abilities. Higher points and higher respondents indicate more difficult items, i.e. high religiosity. Cat1 = "disagree", Cat2= "neutral", Cat3= "agree", Cat4= "strongly agree". Comparison of the histogram with the item difficulties shows a pretty wide distribution of religiosity among students in our sample.



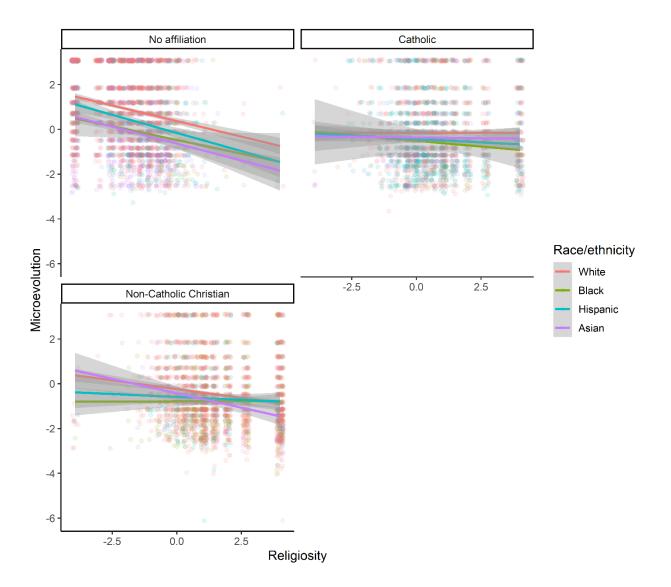
# **Supplemental Figure 5**

Evolution acceptance of students from different racial/ethnic backgrounds by religious affiliation. There are greater differences in evolution acceptance by race/ethnicity among students with no religious affiliation compared to Catholic and Non-Catholic Christian students. Same letter on top of the boxplot indicates that groups are similar and different letter indicates that they are different.

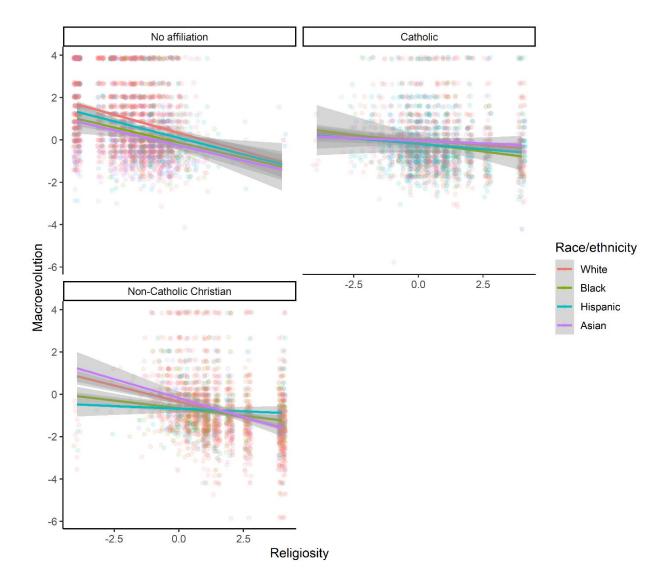


# **Supplemental Figure 6**

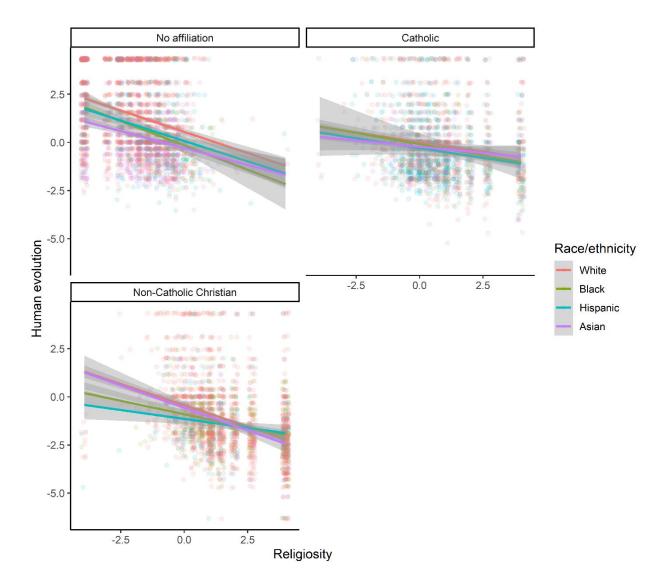
Scatterplots of microevolution acceptance measures against religiosity measures with overlaid OLS regression lines broken down by students' racial/ethnic identity. The points were jittered for clarity, darker points indicate multiple overlapping points, and grey spread around the lines indicates 95% confidence intervals.



**Supplemental Figure 7** Scatterplots of macroevolution acceptance measures against religiosity measures with overlaid OLS regression lines broken down by students' racial/ethnic identity. The points were jittered for clarity, darker points indicate multiple overlapping points, and grey spread around the lines indicates 95% confidence intervals.



**Supplemental Figure 8** Scatterplots of human evolution acceptance measures against religiosity measures with overlaid OLS regression lines broken down by students' racial/ethnic identity. The points were jittered for clarity, darker points indicate multiple overlapping points, and grey spread around the lines indicates 95% confidence intervals.



**Supplemental Figure 9** Religiosity of students from different racial/ethnic backgrounds by religious affiliation. Black students are significantly more religious than students from other race/ethnicities within each of the three religious affiliations. Same letter on top of the boxplot indicates that groups are similar and different letter indicates that they are different.

