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THE RELATIONSHIP BETWEEN ADOLESCENT/YOUNG ADULT BMI AND SUBSEQUENT NON-PROBLEM AND PROBLEM ALCOHOL USE

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BACKGROUND

- Results from previous studies examining the relationship between BMI and alcohol use have been mixed.

OBJECTIVE

- To explore the relationship between BMI in adolescence/early young adulthood and subsequent alcohol non-problem and problem use.

METHODS – Missouri Adolescent Female Twin Study (MOAFTS)

- Twins born between 1975 and 1985 ascertained using Missouri State birth records

- Data for this analysis are derived from the baseline and Wave 4 questionnaires
  - Baseline assessment began in 1995 (median age 15, range 12-23 years)
  - Wave 4 assessments conducted between 2000-2005 (median age 22, age range 18-29 years)

- 3454 twins (461 [13.3%] African-American) with baseline height and weight and wave 4 alcohol use data are used in this analysis

METHODS – Measures

- Baseline interview: Race, Height and weight from baseline twin interview or parental interview (if twin interview unavailable) used to compute BMI (weight in kg/height in m^2)

- Follow-up interview: Alcohol use variables (ever use and age onset, ever intoxication and age onset, current weekly use and current monthly binge drinking), lifetime major depression, regular smoking (100+ cigarettes)

METHODS – BMI categories

- BMI divided into four groups based on CDC adolescent growth curves or adult guidelines (adolescent growth curves are used until the ages at which the BMI curve crosses the adult BMI cutoffs, then the adult BMI categories are used):

    - Underweight (n=238): BMI <18.5 or BMI for age <10th percentile

    - Normal weight (n=2541): BMI 18.5-24.9 if or BMI for age 10th-85th percentile

    - Overweight (n=439): BMI 25.0-29.9 or BMI for age 85th-95th percentile

    - Obese (n=236): BMI >30 or BMI for age >90th percentile

METHODS – Data analysis

- Bivariate analysis: Chi-Square and ANOVA
  - Post hoc tests conducted if omnibus p-value ≤.05

- Multivariate analyses:
  - Cox Proportional Hazards Models for time to first alcohol use and time to first intoxication
  - Logistic Regressions for current weekly alcohol use and monthly binge drinking (5+ drinks)
  - Age, regular cigarette smoking, and major depression were tested as potential mediators or moderators of the relationship between baseline BMI category and all outcomes

- **Race interacted with BMI category for all outcomes, therefore <u>all analyses were stratified by race</u>**

TABLE 1. Sample Characteristics – European Americans

	Under-weight (*n*=219)	Normal weight (*n*=2291)	Over-weight (*n*=330)	Obese (*n*=157)	*p*-value
Age >22 years	46.6[ac]	37.6[bc]	32.7[b]	44.6[c]	.01
Lifetime major depression	20.1	18.6	21.2	24.8	.22
Smoked 100+ cigarettes	34.7	36.9	38.5	48.1	.06
Ever used alcohol	82.19[a]	88.33[b]	89.1[b]	84.62	.05
Age at first use (SD)	17.0 (3.0)	16.7 (2.6)	16.8 (2.7)	17.3 (2.8)	.08
Ever intoxicated	64.4[a]	73.3[b]	64.2[a]	60.9[a]	<.01
Age at first intoxication (SD)	18.5 (3.0)[ac]	18.1 (2.8)[b]	18.5 (2.9)[a]	19.2 (3.2)[c]	<.01
Current weekly drinking	26.0[ac]	26.5[a]	20.7[c]	11.5[b]	<.01
Current monthly binge drinking	25.1[ab]	31.2[a]	25.2[bc]	20.5[c]	<.01

TABLE 2. Sample Characteristics – African Americans

	Under-weight (n=19)	Normal weight (n=253)	Over-weight (n=109)	Obese (n=81)	p-value
Age >22 years	74.7[a]	45.1[b]	56.9	53.2[b]	.04
Lifetime major depression	42.1	21.3	27.5	33.3	.06
Smoked 100+ cigarettes	10.5	14.2	21.1	20.0	.33
Ever used alcohol	84.2	82.6	73.4	75.0	.23
Age at first use (SD)	19.1 (1.7)[a]	18.2 (2.9)[b]	18.9 (3.5)	17.7 (3.9)[b]	.04
Ever intoxicated	36.8	41.9	46.8	40.0	.73
Age at first intoxication (SD)	22.5 (2.6)[a]	20.4 (3.1)[b]	20.8 (3.4)[b]	19.9 (3.1)[b]	<.01
Current weekly drinking	15.8	10.7	13.8	15.0	.66
Current monthly binge drinking	10.5	8.7	12.8	10.0	.68

TABLE 3. Survival Analysis – time to first drink

	HR	95% CI
European Americans (n=2997)		
Underweight	**0.836**	**0.722, 0.968**
Normal weight	1.000	---
Overweight	0.961	0.863, 1.071
Obese	**0.801**	**0.685, 0.937**
African Americans (n=461)		
Underweight	0.817	0.605, 1.103
Normal weight	1.000	---
Overweight	0.798	0.606, 1.050
Obese	0.956	0.711, 1.285

Figure 1. Kaplan Meier survival estimates for time to first drink by BMI category in European Americans (n=2997)
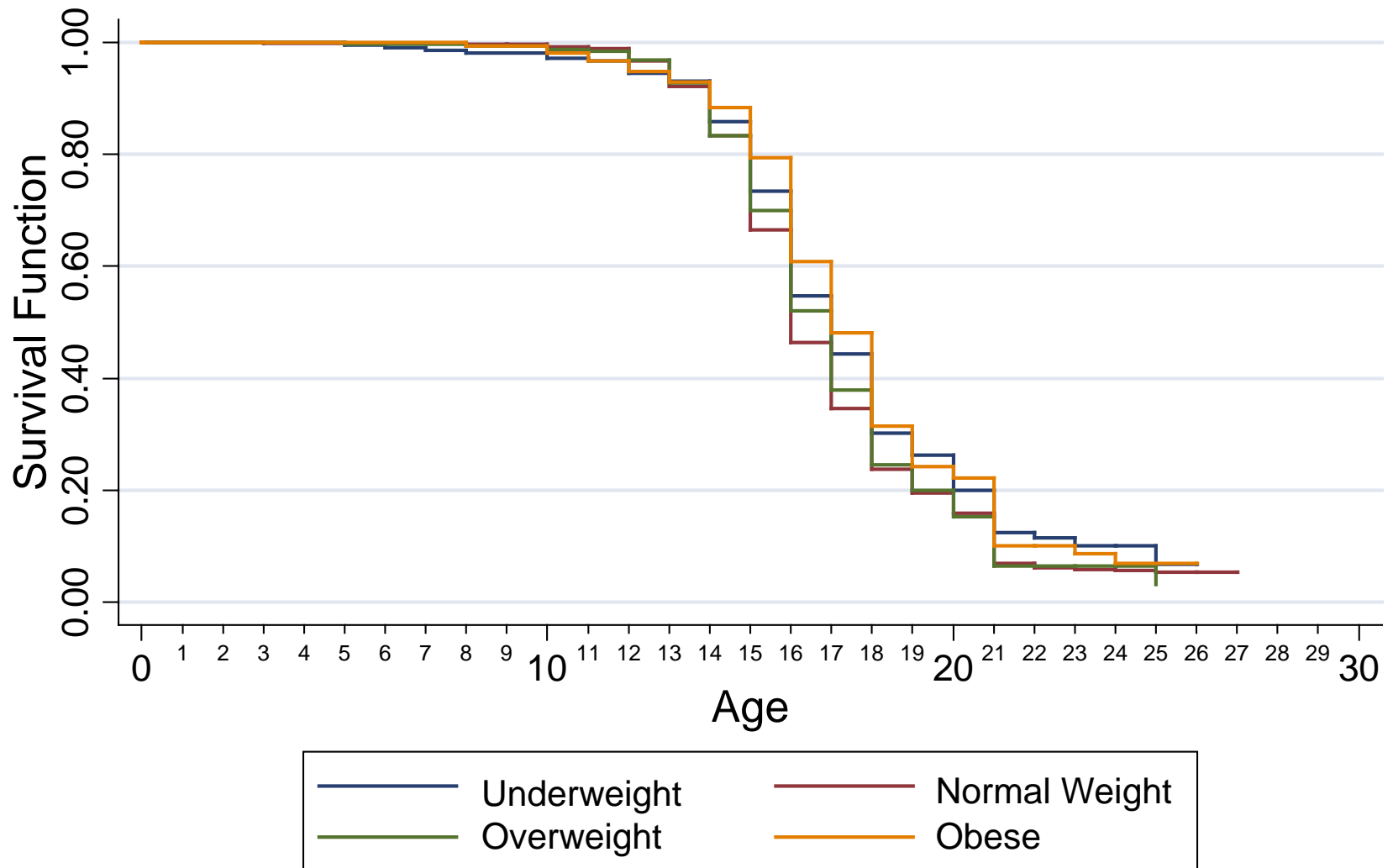
Figure 2. Kaplan Meier survival estimates for time to first drink by BMI category in African Americans (n=461)
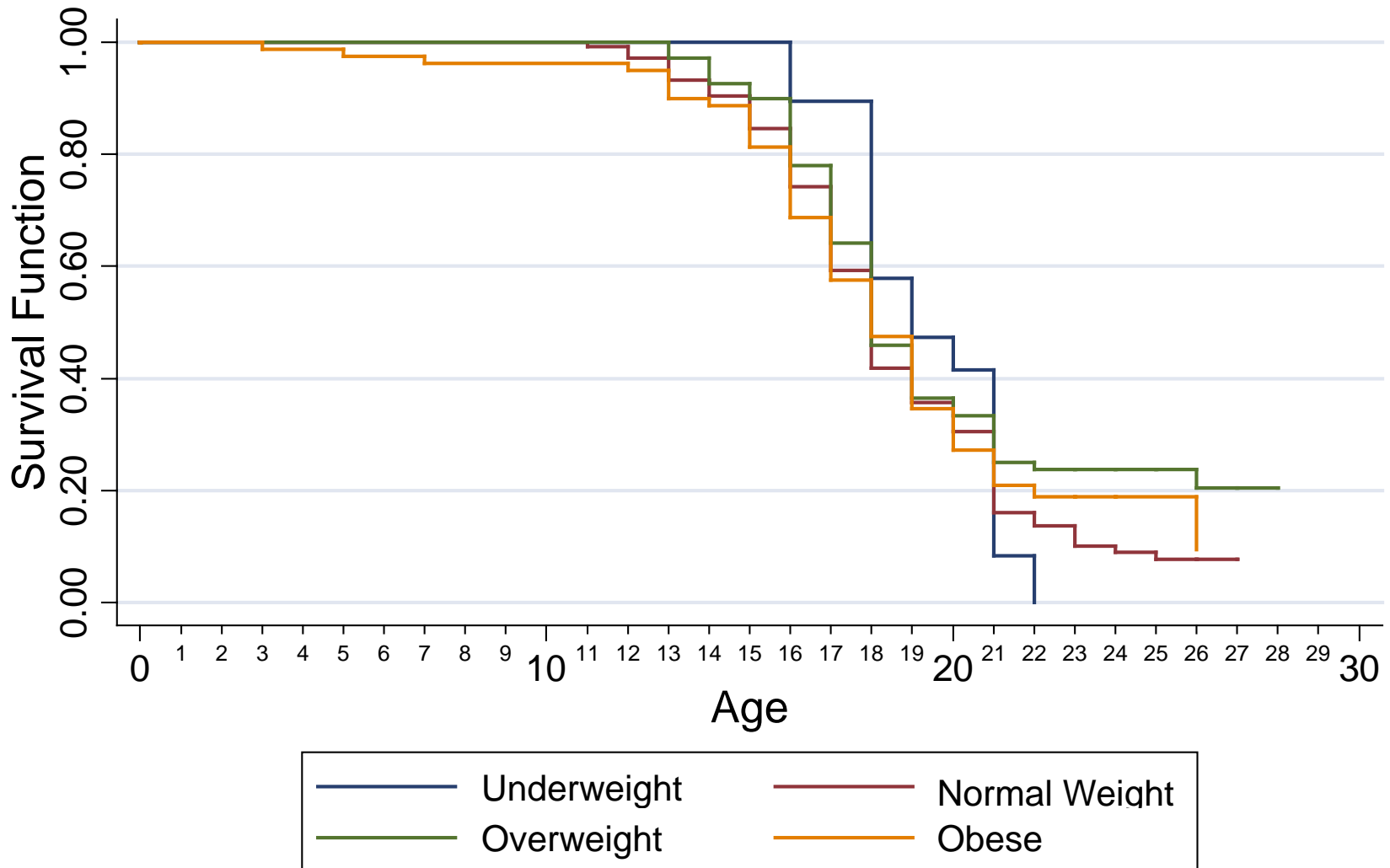
TABLE 4. Survival Analysis – time to first intoxication

	HR	95% CI
European Americans (n=2997)		
Underweight	**0.804**	**0.683, 0.948**
Normal weight	1.000	--
Overweight	**0.756**	**0.660, 0.864**
Obese, intoxication <16 years	**0.396**	**0.260, 0.605**
Obese, intoxication ≥16 years	**0.667**	**0.534, 0.832**
100+ cigarettes, intoxication <14 years	**6.356**	**4.569, 8.841**
100+ cigarettes, intoxication 14-15 years	**2.873**	**2.467, 3.345**
100+ cigarettes, intoxication ≥16 years	**1.984**	**1.778, 2.214**
African Americans (n=461)		
Underweight	0.566	0.312, 1.028
Normal weight	1.000	--
Overweight	1.019	0.714, 1.456
Obese	0.972	0.652, 1.448
Major Depression, intoxication <16 years	**4.116**	**2.154, 7.866**
Major depression, intoxication ≥16 years	1.329	0.936, 1.886

Figure 3. Kaplan Meier survival estimates for time to first intoxication by BMI category in European Americans (n=2997)
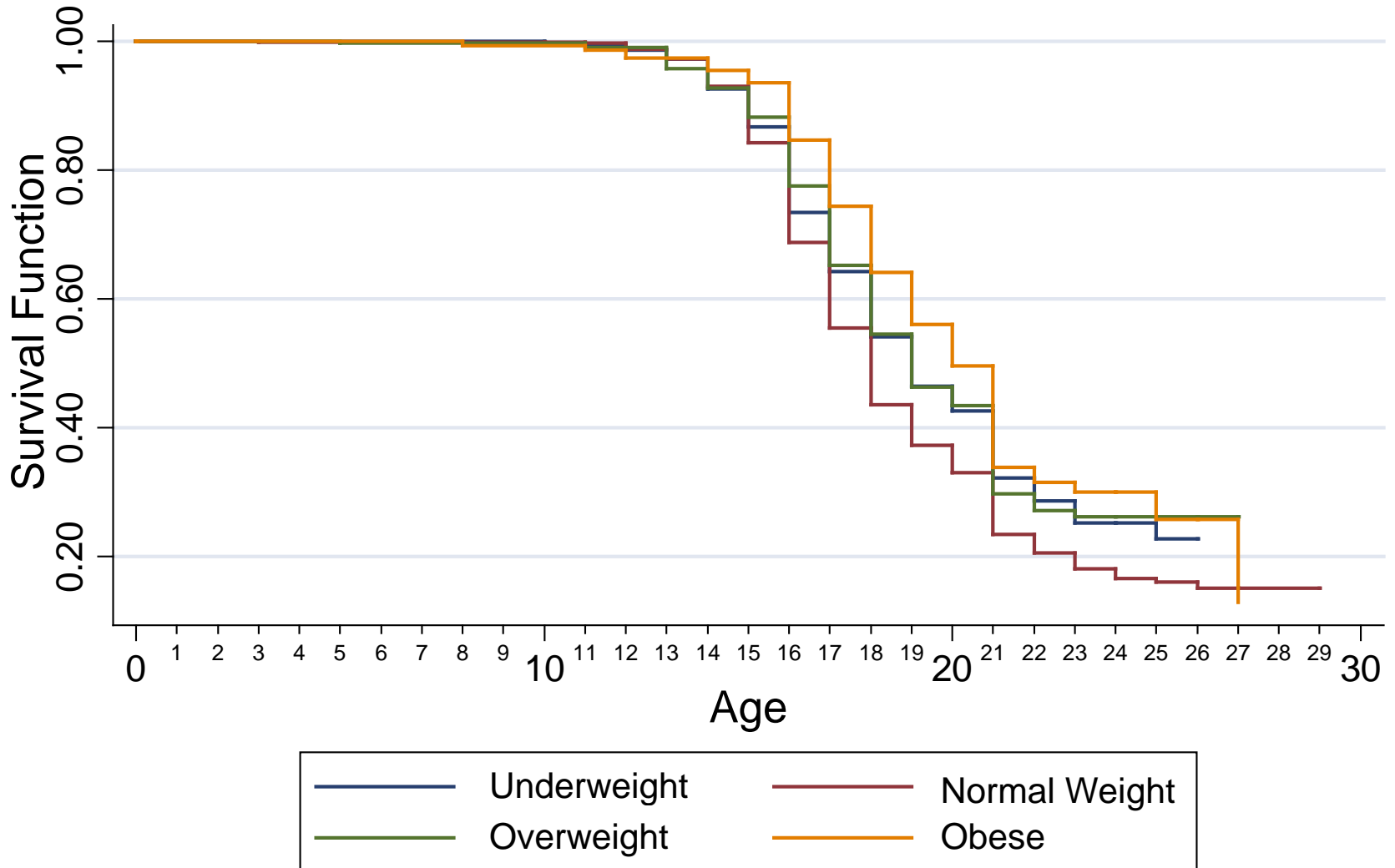
Figure 3. Kaplan Meier survival estimates for time to first intoxication by BMI category in African Americans (n=461)
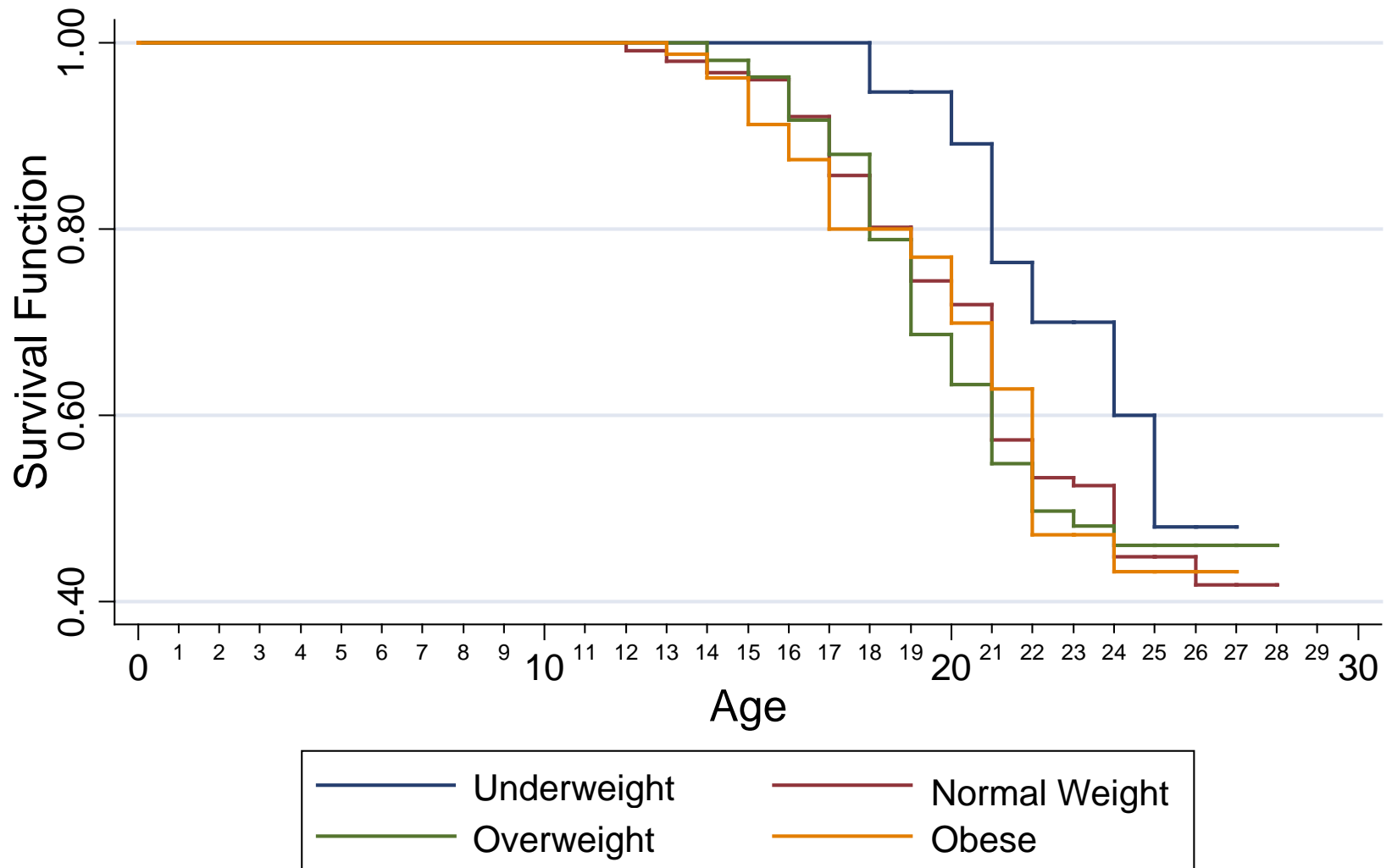
TABLE 5. Logistic Regression – Current Weekly Drinking in European American Ever Drinkers

	OR	95% CI
No Lifetime Major Depression (n=2095)		
Underweight	1.036	0.682, 1.573
Normal weight	1.000	--
Overweight	**0.644**	**0.459, 0.904**
Obese	**0.211**	**0.105, 0.425**
100+ cigarettes	**2.500**	**2.024, 3.087**
Lifetime Major Depression (n=531)		
Underweight	1.329	.669, 2.640
Normal weight	1.000	--
Overweight	0.867	.485, 1.548
Obese	0.687	.315, 1.499

TABLE 5. Logistic Regression – Current Weekly Drinking in African American Ever Drinkers (*n*=365)

	OR	95% CI
Underweight	1.209	0.346, 4.222
Normal weight	1.000	---
Overweight	1.472	0.744, 2.913
Obese	1.750	0.799, 3.832
Age >22	2.082	1.117, 3.881

TABLE 6. Logistic Regression – Current Monthly Binge Drinking* Among Ever Drinkers

	OR	95% CI
European Americans (n=2627)		
Underweight	0.797	0.559, 1.138
Normal weight	1.000	---
Overweight	**0.704**	**0.532, 0.931**
Obese	**0.505**	**0.326, 0.782**
100+ cigarettes	**2.471**	**2.062, 2.962**
African Americans (n=365)		
Underweight	1.336	0.311, 5.740
Normal weight	1.000	---
Overweight	1.739	0.862, 3.510
Obese	1.188	0.467, 3.021
100+ cigarettes	**4.640**	**2.335, 9.221**

*5+ drinks in a day

CONCLUSIONS

- Relationships between body weight in adolescence/early young adulthood and subsequent non-problem and problem alcohol use differ by race.

- There were no statistically significant associations between body weight and problem and non-problem drinking among African American women.

- Among European American women, overweight and obesity appear to be protective against problem and non-problem drinking, despite the additional calories contained in alcoholic beverages and the positive associations between smoking and drinking and smoking and obesity.

- Future research will explore the reasons for this association.