
[All ETDs from UAB](#)

[UAB Theses & Dissertations](#)

2008

Multiracial Tobacco, Alcohol, and Drug Use: An Investigation of the Function of Racial Identity in a Longitudinal Sample From Youth to Young Adulthood

Julia Katrina Crumly
University Of Alabama At Birmingham

Follow this and additional works at: <https://digitalcommons.library.uab.edu/etd-collection>



Part of the [Education Commons](#)

Recommended Citation

Crumly, Julia Katrina, "Multiracial Tobacco, Alcohol, and Drug Use: An Investigation of the Function of Racial Identity in a Longitudinal Sample From Youth to Young Adulthood" (2008). *All ETDs from UAB*. 259. <https://digitalcommons.library.uab.edu/etd-collection/259>

This content has been accepted for inclusion by an authorized administrator of the UAB Digital Commons, and is provided as a free open access item. All inquiries regarding this item or the UAB Digital Commons should be directed to the [UAB Libraries Office of Scholarly Communication](#).

MULTIRACIAL TOBACCO, ALCOHOL, AND DRUG USE: AN INVESTIGATION
OF THE FUNCTION OF RACIAL IDENTITY IN A LONGITUDINAL SAMPLE
FROM YOUTH TO YOUNG ADULTHOOD

by

JULIE KATRINA CRUMLY

CONNIE KOHLER, COMMITTEE CHAIR

LISA GARY

LAURI HYERS

BRAD LIAN

STUART USDAN

A DISSERTATION

Submitted to the graduate faculty of The University of Alabama at Birmingham,
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

BIRMINGHAM, ALABAMA

2008

Copyright by
Julie Katrina Crumly
2008

MULTIRACIAL TOBACCO, ALCOHOL, AND DRUG USE: AN INVESTIGATION
OF THE FUNCTION OF RACIAL IDENTITY IN A LONGITUDINAL SAMPLE
FROM YOUTH TO YOUNG ADULTHOOD

JULIE KATRINA CRUMLY

HEALTH EDUCATION/HEALTH PROMOTION

ABSTRACT

The purpose of the research is threefold. The first purpose is to determine if multiracial individuals are at a higher risk for alcohol, tobacco, and drug use.

The second purpose is to determine the relationship between racial identity and risk behaviors. The third purpose is to determine how the change/no change of racial identity longitudinally contributes to one's risk to engage in risk behaviors.

A national representative longitudinal data set was obtained and analyzed for the purpose of this study. Results of the study reveal that there are differences in multiracial groups for risk behaviors, minority identification is not necessarily protective against these risk behaviors, and that change/no change of racial identity appears to be protective against some risk behaviors while not being protective against other risk behaviors. Implications of the results are discussed.

DEDICATION

While it may be tradition to dedicate the dissertation to the Committee Chair, it is with great pride that I write this dedication to my Chair, Dr. Connie Kohler. I would like to publicly acknowledge my gratitude for Dr. Kohler and convey what an honor it has been to have her as my mentor. I believe it is few students that are fortunate enough to have a true mentor and a student could not be more privileged than to work with Dr. Kohler-either as their teacher, advisor, mentor, or colleague.

Dr. Kohler, you have taken me under your wing and have helped me along my journey. You have been a trusted guide who has held my hand, has shown me the path, given me the courage to not only walk the path, but to create ones of my own. You have been my advocate, creating new opportunities, opportunities that are of no benefit to you, but of only benefit to me.

As I take my final steps along this path and begin a new one, I know that you will always be there for me and will continue to serve as a source of strength and encouragement. How I feel is far beyond words, thank you for everything that you have done and everything that you are.

ACKNOWLEDGEMENTS

I would like to thank each of my committee members for the time and effort they have each devoted to this dissertation. It is an honor that you would each sacrifice your time and skills to help me as a student and to help me complete this process.

I want to express my gratitude to my family and friends for all of their support during this process.

I would like to thank both Lauren Antia and Sally Engler for not only their support, but technical assistance.

TABLE OF CONTENTS

	<i>Page</i>
ABSTRACT.....	i
DEDICATION.....	ii
ACKNOWLEDGEMENTS.....	iii
LIST OF TABLES.....	vii
LISTS OF FIGURES.....	x
CHAPTER	
1 THE PROBLEM.....	1
Introduction.....	1
Terminology.....	3
Statement of the Problem.....	4
Study Purpose/Overview.....	7
Hypotheses.....	8
2 REVIEW OF RELATED LITERATURE.....	9
Multiracial Individuals and Risk Behaviors.....	9
Racial Identity.....	15
Racial Identity and Change.....	19
Racial Identity and Multiracial Individuals.....	21
Simultaneous/Situational Identity.....	25
Functions of Racial Identity.....	31
Biracial/Multiracial Identity Development Models.....	33
Racial Identity and Risk Behaviors.....	41
Multiracial Individuals, Racial Identity, and Risk Behaviors.....	47
Conceptual Framework.....	52
3 METHODOLOGY.....	53
Purpose.....	53
Overview and Type of Research.....	53
Data Construction.....	54

Creating Variables for Those Who Are Multiracial	55
Research Questions/Hypotheses	57
Analytic Approaches.....	58
Data Analyses	60
 4 RESULTS	 62
Research Question 1	62
Tobacco.....	63
Alcohol.....	65
Illicit Drugs	67
Marijuana	68
Cocaine	68
Inhalants/Crystal Meth.....	70
Other Illegal Drugs	71
Research Question 2	72
Tobacco.....	74
Alcohol.....	76
Illicit Drugs	78
Marijuana	79
Cocaine	80
Other Illegal Drugs	82
Inhalants/Crystal Meth.....	84
Research Question 3	86
Tobacco.....	87
Alcohol.....	89
Illicit Drugs	91
Marijuana	91
Cocaine	93
Other Illegal Drugs	95
Inhalants/Crystal Meth.....	97
 5 DISCUSSION	 100
Research Question 1	100
Research Question 2	102
Research Question 3	111
Changing Nature of Racial Identity	112
Limitations	115
Future Research	119
Implications for Future Research.....	119
Current Public Health Practice Implications.....	120
Implications of Current Findings	121
Conclusion	121
 LIST OF REFERENCES	 123

APPENDIX

A Wave 1 Questions	191
B Wave 3 Questions.....	193
C IRB Approval	196
D Unweighted Odds Ratios With 95% Confidence Intervals for Research Question 1 Wave 1.....	197
E Unweighted Odds Ratios With 95% Confidence Intervals for Research Question 1 Wave 3.....	198
F Unweighted Proportions of Minority Identification by Race	200
G Unweighted Odds Ratios With 95% Confidence Intervals for Research Question 2 Wave 1.....	202
H Unweighted Means for Research Question 2 Wave 1	203
I Unweighted Odds Ratios Research Question 2 Wave 3.....	204
J Unweighted Means for Research Question 2 Wave 3	205
K Unweighted Odds Ratios for Research Question 3 Wave 1	206
L Unweighted Means Research Question 3 Wave 1	207
M Unweighted Odds Ratios Research Question 3 Wave 3	208
N Unweighted Means Research Question 3 Wave 3.....	209

LIST OF TABLES

<i>Table</i>	<i>Page</i>
1 Respondents Selecting More Than One Race at Both Waves and Their Selected Racial Identity at Each Wave	131
2 Changing Race Between Waves 1 and 3	132
3 Most Frequently Chosen Race Categories for Those Who Changed From Wave 1 to 3	133
4 Descriptive Statistics for the 5 Largest Racial Groups at Waves 1 and 3.....	134
5 Race and Proportion of Tobacco Use	135
6 Odds of Tobacco Use by Race with 95% Confidence Intervals.....	136
7 Descriptive Statistics for Race and Alcohol Use	137
8 Odds of Alcohol Use by Race with 95% Confidence Intervals.....	138
9 Descriptive Statistics for Race and Marijuana Use.....	139
10 Odds of Marijuana Use by Race with 95% Confidence Intervals	140
11 Descriptive Statistics for Race and Cocaine Use.....	141
12 Odds of Cocaine Use by Race with 95% Confidence Intervals.....	142
13 Descriptive Statistics for Race and Drugs % Yes.....	143
14 Odds of Inhalant and Crystal Meth Use by Race with 95% Confidence Intervals.....	144
15 Descriptive Statistics for Race and Other Illegal Drugs % Yes.....	145
16 Odds of Other Illegal Drug Use by Race with 95% Confidence Intervals	146
17 Proportion of Minority and Majority Identified by Race	147

18	Descriptive Statistics for Minority and White Identified.....	149
19	Racial Identity and Proportion of Tobacco Use.....	150
20	Odds of Smoking by Identity with 95% Confidence Intervals	151
21	Racial Identity and Frequency of Tobacco Use.....	152
22	Racial Identity and Proportion of Alcohol Use.....	153
23	Odds of Drinking by Identity with 95% Confidence Intervals	154
24	Frequency of Alcohol Use by Racial Identity.....	155
25	Racial Identity and Drugs Proportion Who Said Yes	156
26	Odds Ratios for Marijuana Use by Identity and 95% Confidence Intervals.....	157
27	Frequency of Marijuana Use by Racial Identity	158
28	Descriptive Statistics for Cocaine Use by Identity	159
29	Odds of Cocaine Use by Identity with 95% Confidence Intervals	160
30	Frequency of Cocaine Use by Identity.....	161
31	Descriptive Statistics for Use of Other Illegal Drugs	162
32	Odds for Use of Other Illegal Drugs by Identity with 95% Confidence Intervals	163
33	Mean Use of Other Illegal Drugs by Identity	164
34	Descriptive Statistics for Inhalant/Crystal Meth Use.....	165
35	Odds of Inhalant and Crystal Meth Use by Identity with 95% Confidence Intervals.....	166
36	Frequency of Use of Inhalants/Crystal Meth by Identity.....	167
37	Descriptive Statistics for Change.....	168
38	Descriptive statistics for Change and Smoking	169
39	Odds of Smoking by Change and 95% Confidence Intervals.....	170
40	Mean Smoking by Change.....	171

41 Proportion of Alcohol Use by Change.....	172
42 Odds of Drinking by Change with 95% Confidence Intervals	173
43 Mean Alcohol Use by Change	174
44 Proportion Using Marijuana by Change	175
45 Odds of Marijuana Use by Change with 95% Confidence Intervals.....	176
46 Mean Rate of Marijuana Use by Change.....	177
47 Descriptive Statistics for Cocaine Use by Change	178
48 Odds of Cocaine Use by Change with 95% Confidence Intervals	179
49 Mean Cocaine Use by Change.....	180
50 Descriptive Statistics for Use of Other Illegal Drugs by Change	181
51 Odds of Other Illegal Drug Use by Change and 95% Confidence Intervals	182
52 Mean Use of Other Illegal Drugs by Change.....	183
53 Descriptive Statistics for Inhalant and Crystal Meth Use by Change.....	184
54 Odds of Inhalant/Crystal Meth Use by Change and 95% Confidence Intervals.....	185
55 Mean Inhalant/Crystal Meth Use by Change.....	186
56 Substances and Change.....	187

LIST OF FIGURES

<i>Figure</i>		<i>Page</i>
1 Racial Identity Theory Model-modified		188
2 Research Question 2		189
3 Unweighted Description of Change Category		190

MULTIRACIAL TOBACCO, ALCOHOL, AND DRUG USE: AN INVESTIGATION
OF THE FUNCTION OF RACIAL IDENTITY IN A LONGITUDINAL SAMPLE
FROM YOUTH TO YOUNG ADULTHOOD

CHAPTER 1: THE PROBLEM

Introduction

After the Supreme Court overturned laws against interracial marriage in 1967, there was a biracial baby boom in the nation (Chiyoko King & McClain DaCosta, 1996; Colker, 1996; Root, 1992, 1996). The biracial/multiracial population was able to gain recognition by the government in 2000 by being able to accurately identify themselves on the Census; evidence that this is a population that is becoming an increasingly larger part of society by receiving recognition by the government. The Census estimates the biracial/multiracial population to be about 6.8 million (U.S. Bureau of the Census, 2000). While the Census Bureau does not report projections of the multiracial population alone currently, the state of Washington has calculated projections for their own state. According to the state of Washington, it is projected that the fastest growing ethnic group between 2000 and 2030 will be multiracial individuals; further, they estimate an increase of up to 160 percent (State of Washington, 2006). Census projections for American Indian and Alaska Native alone, Native Hawaiian and Other Pacific Islander alone, and Two or More Races has the highest projected percent change in the population compared

to Whites, Blacks, Asians, and Hispanics at a projected change of 217% between 2000 and 2050 (U.S. Bureau of the Census, 2004). Scholars have also weighed in on the demographic changes of the nation noting that “For the first time in history, the number of biracial babies is increasing at a faster rate than the number of monoracial babies” (Root, 1996, p.xiv).

Getting the census to change was a political act. And like other political and historical events, changing the 2000 U.S. Census to allow multiracial individuals to “check more than one” was not an effort met without opposition. Many groups tried to persuade mixed race individuals to identify as one race, even going as far as recruiting celebrities and activists such as Tom Joyner, Travis Smiley, Jesse Jackson, and the NAACP to convince mixed race Black individuals to identify themselves as Black (Lewis, 2006; Rockquemore & Brunnsma, 2002). And while people of mixed race are not a new phenomenon, people understanding and seeing themselves and others as multiracial persons, as their own group, is a relatively new phenomena (Brunnsma, 2006).

Social groups for multiracial individuals have started to formally organize throughout the country, primarily in clusters. Groups like hapa, Fusion, etc, have been forming at college campuses, primarily in the West and East coasts creating what could be considered a multiracial community (Schiff & O’Neill, 2007). These social groups are a place where the multiracial person can be with people similar to themselves, a very unique and new phenomenon for multiracial persons. This growing movement may be the beginning of forming a sense of community for multiracial individuals. Many of these efforts are grassroots, such as Matt Kelley’s MAVIN foundation which publishes a magazine devoted to mixed race issues. Yet, the movement is still in its developmental

stages as even language for how to communicate about these topics varies, such as the terms biracial, multiracial, mixed race, hapa (sometimes used to refer to those that are half Japanese), etc (Schiff & O'Neill, 2007). Until there is a fixed way to have a dialogue about these issues, there will continue to be confusion amongst members of society, members of the multiracial community, and among scholars.

Terminology

Multiracial groups: groups of multiracial individuals that are grouped based on their shared racial/ethnic background (e.g., Asian and White; African American and White; African American and Asian). Sometimes interchangeably used with the term biracial, mixed, or mixed race.

Racial identity: different from ethnicity, racial identity is “the sense of group or collective identity based on one’s perception that he or she shares a common racial heritage with a particular racial group” (Helms, 1990, p.3). For multiracial individuals, this could be the racial/ethnic group of their biological mother, of their biological father, or some other racial/ethnic group. Frequently interchangeably used with the term ethnic identity in the literature.

Race/ethnicity: While race and ethnicity are not the same, the terms are often used interchangeably. When a specific author writes specifically about ethnicity or race, their terminology is applied, otherwise, the term race/ethnicity is used.

Statement of the Problem

Multiracial individuals are a relatively new and large emerging population in the United States. The multiracial population has received only some attention by the research community in regard to risk behaviors, specifically alcohol, tobacco, and illicit drug use, despite the fact that national data indicate this group has some of the highest reported numbers in this area. The National Center for Health Statistics (2006) reports that individuals of multiracial descent ages 12 or older report the highest rate of any ethnic group of using any illicit drug; Further, these individuals have the second highest reported levels of tobacco use. In addition, an empirical research study revealed that adolescents of multiracial descent are at a higher health behavior risk when compared to other ethnic groups and that the rate of driving under the influence for males was highest among individuals of multiracial descent (Caetano & McGrath, 2005).

While there is some research that has been conducted with multiracial individuals and risk behaviors, methods have been inconsistent in regard to measurement of race/ethnicity. Specifically, race/ethnicity is not always measured in the same manner and researchers almost always aggregate multiracial individuals together, regardless of racial/ethnic background (Root, 1992). For example, Asian Whites are grouped together with Asian Blacks. These inconsistent methods of measuring race/ethnicity can be problematic for replication of work and for understanding what is really happening within the population. In addition to the inconsistent ways in which race/ethnicity has been measured, there has been little research investigating factors contributing to these risk behaviors in multiracial populations. Such factors may include racial identity and the switching of racial identity over time. Further, there has been no research that

investigates racial identity and its relationship to risk behaviors in multiracial individuals longitudinally.

Given the changing demographics of the U.S. population, the issue of how multiracial individuals “fit” into public health research is raised. One of the most defining problems with multiracial research in public health is being able to accurately identify individuals who are multiracial. For example, it wasn’t until the year 2000 that the U.S. Census even allowed for multiple racial/ethnic identification and many research studies utilize the federal guidelines for how to ask demographic questions. Therefore, it is not clear what has happened to multiracial individuals in research (e.g., if they were collapsed with other monoracial groups). Another issue is that some researchers have simply eliminated biracial individuals from studies altogether in an attempt to keep the research “clean” (Root, 1992), neglecting a group that deserves research attention. Lastly, standards for how an individual of multiple racial/ethnic backgrounds is “classified” can vary greatly. For example, LaVeist (1994) notes that multiracial individuals are identified by the ethnicity of their father on birth certificates in the United States; which calls into question research that utilizes that type of data. Also, social standards for group qualification can vary greatly. For example, for individuals with Japanese ancestry, qualification for entry into a Japanese American beauty pageant is that the individual be at least one half Japanese descent (King, 2001) while criteria for being placed in an internment camp during World War II was that an individual have one eighth Japanese ancestry (Williams, 1996). For individuals with Black ancestry, the “one-drop” rule has been historically applied. The “one-drop” norm posits that anyone with any ancestry other than White be identified as that other ancestry (Root, 1996).

Given the varied methods by which multiracial individuals have been and can be identified by communities (i.e., social, research), it is imperative that research be conducted measuring race/ethnicity more accurately and to explore the potential differences between the multiracial groups (e.g., Asian and White, African American and White etc.).

One area in which research is needed with multiracial individuals is in the area of risk behaviors. The scope of risk behaviors, for the purpose of this study, will be limited to tobacco, alcohol, and illicit drug use. According to the National Center for Health Statistics (NCHS, 2006), multiracial individuals ages 12 or older report the highest percentages of using any illicit drug or using marijuana. Further, they have the second highest percentages for nonmedical use of any psychotherapeutic drug, second highest for alcohol use, second highest for any tobacco use, second highest for cigarette use, and are tied for second with White's for cigar use. Further, the Substance Abuse and Mental Health Services Administration (SAMHSA) 2004 data (SAMHSA, 2004) regarding illicit drug use reveal that, 54.9% (second highest) of multiracial individuals 12 or older report having used illicit drugs in their lifetime, 21% (second highest) reported having used in the past year, and 13% (the highest) reported having used illicit drugs in the past month. In light of these data, it is imperative to investigate multiracial groups in a disaggregated manner in order to understand what is happening in this population and what factors, such as one's racial identity at a given time and the changing of that identity over time, may be contributing to or protecting individuals from use; as we already know that there are differences among monoracial groups, there may also be differences among multiracial groups.

Further, there needs to be an investigation into the role of racial identity and risk behaviors for multiracial individuals. Specifically, whether or not a minority racial identity is protective for multiracial individuals across tobacco, alcohol, and illicit drug use should be examined. While it is known that being racially identified can be psychologically protective (e.g., self esteem) for multiracial individuals, it is not known whether or not this protection extends to other areas, such as behavior and engaging in risk behaviors. Research reviewed for monoracial individuals and the protective ability of racial identity against engaging in risk behaviors is promising revealing what appears to be the potential for racial identity to be protective against engaging in risk behaviors for monoracial individuals. Whether or not this protection extends to multiracial individuals is not known. In light of the phenomenon of situational identity or a change in racial identity amongst multiracial individuals, it is necessary to examine the occurrence of this and how it plays into one's risk of engaging in risk behaviors.

Study Purpose/Overview

The purpose of the proposed research is threefold. The first purpose is to determine if multiracial individuals (e.g., Asian and White, African American and White) are at a higher risk for alcohol, tobacco, and drug use. The second purpose is to determine the relationship between racial identity and risk behaviors. And the third purpose of the proposed research is to determine how the shifting/stability of racial identity longitudinally contributes to one's risk to engage in risk behaviors.

Hypotheses

- Odds of risk behaviors will not vary by racial group.
- Racial identity does not vary by multiracial group. Specifically, the proportion who identify as a minority will not vary by multiracial group.
- Individuals who racially identify with a minority group will be less likely to and have lower rates of engaging in risk behaviors compared to individuals who identify with Whites.

The remainder of the proposal will encompass a description of the relevant literature related to the topic. Second, a description of the data, research design, and data collection methods will be discussed. While the results, discussion, and limitations follow.

CHAPTER 2: REVIEW OF RELATED LITERATURE

Research studies conducted to investigate risk behaviors in samples of multiracial individuals are limited in number. While there have been some empirical studies investigating risk behaviors in samples of multiracial individuals, the majority have used cross sectional data, have examined only rates of use, and have used a variety of ways to classify multiracial persons. The remainder of the chapter will encompass a review of relevant literature. Relevant literature includes studies of multiracial individuals and risk behaviors, racial identity and its functions, and a review of relevant literature investigating the relationship between racial identity and risk behaviors.

Multiracial Individuals and Risk Behaviors

Beal, Ausiello, & Perrin (2001) investigated peer and parental influence on risk behaviors of middle school aged individuals from minority groups. Using a cross sectional survey that assessed tobacco, alcohol and marijuana use, and sexual activity. The overall sample size used for analysis included 82 Latino adolescents, 72 Black adolescents, and 22 “biracial” adolescents. Beal et al. (2001) found that biracial adolescents have a significantly higher health behavior risk when compared to other racial groups. Results of the study revealed that biracial adolescents had significantly higher rates of marijuana use (26%, n=5) when compared to Black adolescents (17%, n=11) and Latino adolescents (6%, n=4). While, there were no significant differences in

the use of tobacco or alcohol for biracial individuals compared to Black (49%, n=31) or Latino (49%, n=36) adolescents, percentages were larger for the biracial participants (55%, n=11) than for the other two groups. A series of logistic regression analyses were conducted to determine factors related to tobacco, alcohol and marijuana use, and sexual activity. None of the odds ratios by race were significantly different between the three racial/ethnic groups. While Beal et al.'s (2001) study provides valuable empirical data, limited conclusions should be drawn from this study due to their particularly small sample sizes.

Whaley & Francis (2006) conducted an analysis using the 2001 Youth Risk Behavior Survey (YRBS). The purpose of their study was to determine if adolescents who self-identify as being multiracial had more negative health behaviors than their appropriate reference group of monoracial adolescents. The racial/ethnic groups that were utilized in this analysis included Hispanic/Latino, multiracial Hispanic/Latino, and multiracial non-Hispanic/Latino. Results of the weighted linear regression models reveal that both multiracial Hispanic ($M = 1.89$, $SE = .13$) and multiracial non-Hispanic ($M = 1.71$, $SE = .08$) adolescents had significantly higher scores on smoking compared to Hispanic/Latino ($M = 1.45$, $SE = .05$) adolescents ($F = 7.60$, $p = .001$). Further, multiracial Hispanic/Latinos ($M = 1.69$, $SE = .03$) had significantly higher scores on substance abuse which included items on alcohol, marijuana, cocaine, and sniffing glue compared to Hispanic/Latino adolescents ($M = 1.46$, $SE = .03$) ($F = 5.20$, $p = .010$). Whaley & Francis (2006) conclude that their hypothesis, that multiracial Hispanic youth have more behavior and health problems than monoracial Hispanic youth, was supported

by the data and is in line with psychological literature showing that those adolescents who identify as multiracial have adjustment problems.

One study that was conducted investigating risk behaviors in disaggregated groups of multiracial individuals was conducted by Udry, Li, & Hendrickson-Smith (2003). Udry et al. (2003) studied a national sample of multiracial and monoracial adolescents to examine health and health risk status using the Add Health data¹. Two sets of analyses were conducted in this study, one set with multiracial adolescents aggregated together and another with multiracial adolescents disaggregated. Results of the Udry et al. (2003) study revealed that, based on the calculation of odds ratios for various behaviors, multiracial adolescents are at a higher health behavior risk compared to their monoracial counterparts. Significant odds ratio variables pertinent to the current review include smoking and drinking. The authors then conducted an analysis that split multiracial adolescents into racial/ethnic groups (e.g., White/Asian, Black/Asian) and compared those groups to the reference groups made up of those specific racial/ethnic groups (e.g., comparison of White/Asian to Whites then to Asians), a method that other studies have used (Herman, 2004). This analysis also revealed significant odds ratios for smoking and drinking. Specifically, relevant results include those multiracial Black/White individuals had significant odds ratios for smoking (2.66), drinking (1.52), and being drunk regularly (2.09) when compared to their Black reference group. Multiracial White/American Indian individuals had significant odds ratios for smoking when compared to their White (1.54) and their American Indian (1.36) counterparts and

¹ Add Health is a national longitudinal study of a representative group of individuals across the country. These individuals are followed from youth to young adulthood in order to examine social factors in youth and their relationship to health outcomes in the future. Wave 1 occurred between 1994-1995 and Wave 3 during 2001-2002.

had significantly higher odds ratios for drinking (1.37) compared to their White counterparts. For Asian/White individuals, odds ratios were significant when compared to their Asian counterparts for drinking (2.06) and being drunk regularly (1.97). Black/Asian individuals had significant odds ratios when compared than their Black (3.44) and Asian (2.22) counterparts for smoking and had significant odds ratios when compared to Blacks (2.22) for regular drinking, and had higher odds ratios than Black (4.08) and Asian individuals (4.25) for being drunk regularly.

Caetano & McGrath (2005) conducted a study investigating the rate of reported driving under the influence across a nationwide sample of over 39,000 individuals from a variety of racial/ethnic groups. The racial/ethnic groups under investigation included Asian, African American, American Indian/Alaskan Native, Hispanic, Native Hawaiian Islander/Other Pacific Islander, White, and Mixed/Other. Chi-square results of the study revealed that the rate of driving under the influence of alcohol for males was highest among multiracial males (22.5%). Also, for multiracial females, the rate of driving under the influence of alcohol was second highest (14.2%). In regard to arrest rates, multiracial males had the highest rate of having been arrested for driving under the influence of alcohol or drugs (5%). This study shows that for multiracial/other individuals, the use of alcohol and other drugs are influencing behavior or that behavior is influenced by multiracial group. However, some caution should be used in interpreting these data for multiracial individuals as they were aggregated with other smaller groups.

Fulkerson & French (2003) conducted a study to investigate cigarette smoking in adolescents. Of specific interest to the authors were how cigarette smoking was or was not used for weight loss or weight control. Fulkerson & French (2003) sampled 79,326

sixth, ninth, and twelfth graders within the public school systems in Minnesota. The authors conducted logistic regression analyses in order to determine if there were differences in cigarette smoking and its use for weight loss or control between the different racial/ethnic groups. In this particular study, the multiracial individuals consist primarily of individuals of both American Indian/White descent. Results of the analyses for multiracial individuals included several important findings. Multiracial girls (26.5%) and American Indian girls (29.4%) had the highest rates of smoking for the purpose of controlling or losing weight. When examining individuals who *smoke* for the sole purpose of losing or controlling their weight, the highest rates were among multiracial individuals (55%). When looking at the odds ratios, multiracial girls who saw themselves as overweight were more likely to smoke (2.67) than other girls that smoked and did not perceive themselves as overweight, to smoke. Further, this also held true for multiracial boys (1.90).

In a qualitative and quantitative review of multiracial individuals and several outcome variables, one of which was problem behaviors, Shih & Sanchez (2005) reported several interesting findings. In what the authors termed “problem behaviors” which included delinquency, drug or alcohol use, smoking, and adolescent sexual activity, their review of qualitative studies of multiracial individuals in non clinical populations found that only three of the twenty studies reviewed reported findings of problem behaviors among multiracial participants (Shih & Sanchez, 2005). Of the quantitative studies reviewed, there were nine studies found, two of which contained variables of interest in the current study and one of those two was discussed earlier in this paper (see Beal et al. 2001). Of the remaining quantitative studies that Shih & Sanchez (2005) reviewed, one

found that Vietnamese Americans used more alcohol in comparison to their monoracial counterparts (see McKelvey & Webb, 1996).

However, the authors caution against drawing conclusions about the number of qualitative studies and using it as a comparison against those qualitative studies that did not report negative findings due to the fact that the nature of the qualitative studies themselves may have lended themselves to focus on a particular issue or further probing into a particular issue while other qualitative studies may not have. Further, Shih & Sanchez (2005) limited their review of quantitative studies to those that included monoracial comparison groups.

In summary, the majority of reviewed studies that included multiracial individuals examined alcohol and tobacco with less focus on illicit drug use. For alcohol, the reviewed studies found multiracial individuals to be the highest reported users and the highest number of those who drive under the influence (Caetano & McGrath, 2005; Udry et al., 2003) while only one study found no differences among multiracial and monoracial individuals (Beal et al., 2001). For tobacco use, Udry et al. (2003) and Whaley & Francis (2006) found multiracial individuals to be most likely to smoke whereas the Beal et al. (2001) study did not find any differences among multiracial and monoracial individuals in smoking. Lastly, the only reviewed study that examined illicit drug use found that biracial individuals have higher rates of illicit drug use compared to monoracial individuals (Beal et al., 2001). The reviewed studies in conjunction with national data show an apparent trend that multiracial individuals are using alcohol, tobacco, and illicit drugs at higher rates than monoracial populations.

Methodologically, these reports (Beal et al., 2001; Caetano & McGrath, 2005; Udry et al., 2003; Whaley & Francis, 2006) either fail to mention how they assessed multiracial status or wrongly label multiracial individuals as being identified (different than heritage) as multiracial by using racial self-report; which has been shown to be unreliable and problematic (Harris & Sim, 2002; Hitlin, Brown, & Elder, 2006). And while there have been some empirical studies of risk behavior that have included individuals of multiracial descent, they are limited and predominantly focused on the adolescent (Beal et al., 2001; Udry et al., 2003) Further, there have been a very limited number of empirical studies (Udry et al., 2003; Whaley & Francis, 2006) conducted where individuals of multiracial descent were not aggregated together; however, those empirical studies were conducted using samples of adolescents and did not examine contributing or protective factors (i.e., racial identity) which is important.

Racial Identity

Helms (1990) has defined racial identity as “the sense of group or collective identity based on one’s perception that he or she shares a common racial heritage with a particular racial group” (p.3). Several options for racial identity exist for the multiracial individual. They can identify with their maternal racial group, paternal racial group, both groups, or neither group. Identification with one group is termed monoracial identity while identification with more than one group is termed biracial/bicultural identity. According to Helms (1990), it is possible that individuals feel good with themselves and their lives even if they don’t identify with either of their racial groups.

Helms (1990) delineates between two kinds of racial identity models, type and stage. The type framework purports that by identifying one's identity, you can understand one's behavior. However, this particular framework does not view racial identity as a dynamic process that is ever changing. The stage framework, such as Cross's model, however views racial identity as a process where individuals can move through stages. In the stage framework, one's behavior can be understood through the particular stage the person is in at that time. It is not fully understood how change or no change in racial identity over time can contribute to the prediction and explaining of behavior. The proposed study will combine aspects of type and stage frameworks for racial identity in contributing to the prediction and explanation of behavior. Specifically, the type framework is used in that understanding one's identity can lead to the understanding of their behavior; While the buffering aspects of Cross's stage framework is used to understand how racial identity is related to behavior.

As Phinney (2006) notes, for minority groups, feelings of membership in a racial group is an issue that is prevalent in the life of the minority individual so much so that it is a significant influence on them through adulthood. Further, for ethnic minority groups, the exploration of where they belong (group membership) may lead to their identity being further explored into later years than for non minority groups, as far as beyond their 20's (Phinney, 2006). While Phinney (2006) is specifically discussing monoracial ethnic minorities, this may also apply to multiracial individuals, as their sense of membership to a group may be an issue questioned well into adulthood.

Further, racial/ethnic identity development starts with knowing that there are things about oneself that are different from others. But it is also those things that make

one different from others that also make them similar to others, from the same racial/ethnic group, which may help to explain some of the striking differences in the variation of racial identity among multiracial groups, as some researchers have noted that some racial groups are “more accepted” than others (i.e., model minority-Asian groups) (Phinney, 2006). According to Phinney (2006) (who forms the basis of her assertions from Quintana’s 1994 model; see Quintana, 1994) these differences are noticed by individuals when they are children but become much more noticeable during adolescence. Further, children and adolescents interpret these differences in different ways. For example, children tend to understand differences in concrete terms such as skin color, but then, they begin to understand differences in terms of language, food, and then social awareness which may be in the form of noticing prejudice (Phinney, 2006). However, the adolescent individual develops a sense of these differences in terms of having a shared perspective with their racial/ethnic group and how this impacts how they view themselves (Phinney, 2006). But can this model really apply to multiracial individuals, who may still be struggling to understand what racial/ethnic group they belong to, have yet to see that a multiracial group exists as a communal whole, and that an ethnic group consciousness may exist exclusive to multiracial persons?

Phinney (2006) notes that the period of adolescence is one that is critical in the development of an ethnic group identity. Minorities are in a process of exploration of the self and group membership, but this process is not completed in adolescence but can go well beyond adolescence. Phinney (2006) reports that in her study approximately three quarters of those ethnic minorities had formed their identity through exploration and

resolve. What does this say for multiracial persons? How long do they explore what group they are a member of?

Even with monoracial ethnic minorities, achievement of a “stable” racial/ethnic identity may be reached in adolescence but even monoracial ethnic minorities may reevaluate their ethnic identity as a result of changes in their lives or as new situations arise (Phinney, 2006). So this phenomenon of change is not necessarily unique to multiracial individuals as how one views oneself may change as one’s life circumstances and experiences change, leading to further exploration who one is (Phinney, 2006). As Phinney (2006) notes,

Quintana’s (1994) model describes further progress beyond adolescence in the understanding of ethnicity. In their 20’s young people become capable of seeing ethnicity in a wider context. They can take the perspectives of other ethnic or racial minority groups and of the dominant ethnic group. They can thus develop a multicultural viewpoint that includes an increased understanding of both intergroup conflict and the possibility of intergroup acceptance and positive interaction. Furthermore, they have a greater awareness of the diversity within their own group and other groups that can lead to an increased appreciation for the complexity of experiences related to ethnicity. These broader perspectives are likely to contribute to continued exploration of the implications of ethnicity. (p. 121)

Racial Identity and Change

Racial/ethnic identity for both monoracial and multiracial individuals can change over time. These changes may occur as the result of developmental, contextual, and life experiences (Phinney, 2006). So, instead of identity being thought of as an achieved state, it can be thought of as dynamic (Phinney, 2006) where one can even “recycle” back to another stage. However, the literature on racial identity and changes in racial identity longitudinally are limited for monoracial individuals, and of available literature, there was only one national study found (see Hyers, 2001); the literature on change in identity for multiracial individuals is limited to those studies using Add Health data.

Literature on change in identity in monoracial groups has focused on changes within stages based on models of racial/ethnic identity development. Syed, Azmitia, & Phinney (2007) sought to study changes in ethnic identity over time and whether change varied by context in a sample of Latino college students in California. They were particularly interested in whether individuals regressed or progressed in stages from their first year of college to their second year of college and how they changed in their levels of ethnic identity exploration and commitment. Of note, twelve participants in their sample of 128 were multiracial. Results from their study revealed that there were changes in ethnic identity status between semesters. Specifically, most individuals appeared to move forward in stage as opposed to regressing (e.g., moving forward in a stage or going back to another previous stage). These findings are particularly important as, “These results provide evidence for the continuing negotiation of ethnic identity in emerging adulthood, as well as the malleability of the ethnic identity statuses during this developmental period, even for those who initially were ethnic identity achieved

(Phinney, 2006).” (p.171, Sved et al., 2007). According to Sved et al. (2007) results from this work marks the importance of conducting longitudinal studies with ethnic identity and of allowing for researchers to really examine the “negotiation” and “renegotiation” of identity. They further note that an “important area” of future research would be to examine ethnic identity development in multiracial persons.

Hyers (2001) studied change in ethnic/racial identity in a national sample of African Americans from two separate longitudinal national data sets. The first data set, the National Black Election Panel Study (NBEPS), consisted of four waves of data with the time between the first and the last waves collected being four years (1984-1988). The second data set, the National Survey of Black Americans (NSBA), consisted of four waves also with the time between the first and last waves collected being 4-5 years (1987/1988-1992). The purpose of Hyers’ (2001) study was to explore racial/ethnic identity using a framework where the kind of racial identity was examined (Preencounter, Immersion, Internalization), as opposed to how much one identifies with a group.

Results of the Hyers (2001) study revealed that over time individuals did not remain stable in their identity but that there were significant movements within the sample. In the NBEPS data, which compared changes across a four year time span, it was found that the majority of those individuals who were initially in preencounter (a non identified type of identity) moved to another identity type (Immersion, Internalization) which are considered types of Black identity. In other words, those who were initially not racially identified became racially identified four years later. Further, about a third of that sample regressed to an earlier stage from being initially racially identified, to not being racially identified at all. A similar pattern was found in the NSBA data where most

individuals had moved from a non identified state at Wave 1 to a racially identified state at a later wave.

In both the Sved et al. (2007) and Hyers (2001) studies there was evidence found of monoracial groups changing their identity over time. In fact, in both studies they found that not only did individuals move “forward” in becoming racially identified but they also “regressed” or “recycled” back. Further, it is interesting to note that the Sved et al. (2007) study looked at changes across one year in college while the Hyers (2001) study looked at changes across one to four years in time. While both studies were able to measure racial/ethnic identity and stage/type of identity, this type of measurement is not really possible with a multiracial population for a number of reasons- the most important being (1) that there is yet to be a clear, established, and widely accepted method for measuring racial identity among multiracial individuals and (2) models for identity development have not yet been widely tested/accepted.

Racial Identity and Multiracial Individuals

While it was originally thought that multiracial persons developed their identity via their interactions with their respective monoracial groups, it may be that multiracial individuals simultaneously have more than one identity which is formed irrespective to experiences with other groups (Ahnallen, Suyemoto, & Carter, 2006). Ahnallen et al. (2006) propose that

Multiracial identity may be constructed independently and individually, without reference to social variables related to specific identities or groups and may not depend on physical appearance, groups’ identities, or social variables. This

hypothesis suggests that multiracial identity may be less of a socially reference or socially constructed identity compared with monoracial identities. (p. 682)

However, other theorists suggest that multiracial identity is heavily related to social relationships and physical appearance and that the bonding with others of mixed race and relating to their similar life experiences help to support a positive racial identity (Schiff & O'Neill, 2007). Thus, the literature is not clear on contributing factors to racial/ethnic identity for multiracial individuals.

Identification styles may vary across different multiracial individuals and multiracial groups. Factors that may influence racial identity development for multiracial individuals include environmental influences, skin and facial features, the demographic profile of one's community, mother's ethnicity, and support from family and friendship networks (Garcia & Lega, 1979; Herman, 2004; Johnson, 1992; Miville et al., 2005; Root, 1992, 1996). In a study by Ahnallen et al. (2006) of Japanese American and European American individuals, they found that physical appearance, feelings of exclusion from the group, and a feeling of belonging to a racial group were related to racial identity with that monoracial group; with exclusion being the strongest relationship to racial identity. In other words, Japanese White individuals' appearance, how much they felt excluded from and belonging to a group were significantly related to how they identified themselves. Further in their qualitative portion of the study, they examined how Japanese Whites thought of belonging and exclusion with regard to racial groups. Findings were that feelings of belonging were about being accepted, having shared experiences, and being able to identify with "common struggles" (p. 681). Whereas meanings of exclusion were about having to defend one's race/ethnicity, not belonging,

racism, and having racial group membership be qualified by appropriate physical appearance (looking Japanese qualifies one as Japanese). So, it may be that shared experiences and common struggles may be particularly important for multiracial individuals.

Herman (2004) examined a 1987 dataset of multiracial individuals in order to determine, among other things, how different multiracial groups varied in their racial identity. The dataset consisted of over 10,000 high school students from nine different schools in California and Wisconsin. Multiracial individuals were identified by race of the parents. Racial identification for the respondent, measured as which one best describes you, was a forced-choice single-response question. Upon examination of the results of the different multiracial groups and their responses to the race question reveals that the majority (68%) of Black/White individuals reported being Black compared to White (16%). For Asian/White individuals, 33% reported being White while 43% reported Asian and 52% of Hispanic/White individuals reported being Hispanic compared to 38% as White. All differences were significant.

While racial identity may differ across individuals and groups, it may also differ across contexts. Specifically, multiracial individuals may view themselves as one race/ethnicity in one context and as a completely different race/ethnicity in a different context. For example, an Asian/White individual may view themselves as Asian in a situation of White persons and as White in a situation of Asian persons. It has also been found that for different identification styles of biracial individuals, amount of anxiety when interacting with the different ethnic groups that make up their backgrounds differs

greatly and may contribute to identity varying across contexts (Suzuki-Crumly and Hyers, 2004).

In a qualitative study by Miville et al. (2005), they attempted to determine what themes existed for racial identity development for a variety of multiracial persons. Further, the authors sought to see how those themes were the same as or different from current models of biracial/multiracial identity development. In this study of 10 multiracial individuals, four themes became apparent: (1) encounters with racism (2) reference group orientation (3) the “chameleon” experience (4) critical people, places, and periods. The first theme, encounters with racism, refers to the various encounters that individuals had that were racist in nature that served as an incident that moved the individual to change their racial identity, either to further identify with the group which they already identified with, or to identify with another group. The second theme, reference group orientation, refers to the primary group that the individual identifies with. For example, an individual may identify primarily with African Americans but sometimes identify with another group. The third theme, the chameleon experience, refers to the process of adapting to the situation one is in and the experience of never fully feeling a part of the group. The fourth theme, critical people, places, and periods, refers to people, places, or periods in one's life that were critical to shaping their racial identity.

In Miville et al.'s (2005) study, most of their participants identified with only one racial group. Further, many participants acknowledged identification with a multiracial group but the authors suggest that this may be a private identity as there isn't typically a readily visible multiracial group with whom to have a public identity. Further, the

majority of participants identified with the racial group of the parent they felt closest to or saw as the most dominant within the home. And those multiracial individuals who had White as part of their background identified with the non White part of their background.

Simultaneous/Situational Identity

There are four specific ways in which the multiracial person may engage in to connect the pieces of their whole together (Root, 1996). The four ways in which multiracial persons can negotiate their identity are best summarized by Miville et al. (2005). According to Miville et al. (2005), the four strategies are (1) the ability to hold more than one cultural perspective simultaneously (2) situational or shifting identity (3) an independent multiracial reference point (4) having a monoracial identity. The ability to carry multiple cultural perspectives simultaneously refers to the multiracial person's capacity to hold more than one perspective at a time as opposed to a splitting of one self or "fence riding" (Root, 1996). In Miville et al.'s (2005) study, participants tended to hold multiple identities simultaneously, both monoracial and multiracial. And while a multiracial label was held by most, the monoracial label was the label with which one publicly identified. Miville et al. (2005) point out that this is particularly important for multiracial individuals as having a public monoracial identity provides individuals with a way to connect to others and therefore serves as a buffer to racism that one encounters. However, having a multiracial identity may be able to provide the same benefits as a monoracial identity for buffering of encountered racism if there were in fact a visible multiracial community with which multiracial persons could connect and develop relationships (Miville et al. 2005).

Situational or shifting identity refers to the changing of one's racial identity dependent upon the environment or the context in which one is in (Miville et al., 2005). Situational identity involves the multiracial person clarifying ambiguity or meeting and adapting to those demands in that context or environment (Root, 1996). Fuji Collins (2000), who conducted a qualitative study on biracial identity development, found that the majority of participants utilized their racial/ethnic identity according to the situation they were in, which he terms the chameleon effect. Fuji Collins (2000) purports that situational identity was used by some as a "survival tool" and by others as a way to cope with being marginalized and isolated. In the Miville et al. study (2005), they termed this the chameleon experience where participants had reported that their method for social interactions was one in which they adapted to the context or situation in which they were. Further, Miville and colleagues (2005) suggest that this ability may "...enhance psychological functioning by, for example, developing increased cognitive flexibility and openness" (p. 512). However, in Miville et al.'s (2005) study, the participants also reported that when engaging in this type of negotiation, they felt as if they never completely fit into a group, they felt as if they were a part of each group but not a "full part."

The Chameleon Effect works in strange ways, I keep telling myself. One day, the world sees me as black. The next day, I'm Hispanic. The day after that, I'm White. And then there are days when I'm a nigger walking down the street. (p.75, Lewis, 2006)

said a biracial Black/White writer. One Hispanic/White woman interviewed responded that

when you're being mixed, it's kind of interesting, because when you're around a lot of Hispanic people, you can kind of play off that side of you, but then if you're around a lot of White people, you can play off that side of you as well. (p. 148, Schiff & O'Neill, 2007)

But this situation is not necessarily true nor easily executed by all multiracial persons, with some multiracial persons experiencing a great deal of anxiety when interacting with individuals from their respective heritages (Suzuki-Crumly & Hyers, 2004). So, while a situational, chameleon, or changing identity may be beneficial, it may also be harmful.

Claiming an independent multiracial reference point apart from family and peers actually refers to the multiracial person sitting on the border. In this case, the border is the reference point for multiracial persons. Multiracial individuals who find themselves utilizing this strategy may be characterized by focusing on persons and their character as human beings and may prefer to label oneself as multiracial as opposed to some other label such as "other." Similarly, Anzaldúa (2007), a multiracial and lesbian essayist, refers to this process as living in the "borderlands" an experience that others have also written on (Corral, 1998).

Lastly, maintaining a monoracial identity when entering different cultural environments refers to having one identity that is not fleeting and is stable across movements to different contexts. In this method, it is possible for the multiracial person to change their monoracial identity later in time. Characteristics of the multiracial person utilizing this strategy include being in an environment that is supportive of one's psychological, emotional, social, and political needs (Miville et al., 2005).

Research on multiracial individuals and identity changing has been limited. Research on multiracial individuals and racial identification over time is almost non-existent (Hitlin, Brown, & Elder, 2006). However, work by Harris and Sim (2002) and Hitlin et al. (2006) can be used to provide a glimpse into the Add Health data set. Harris & Sim (2002) utilized Wave 1 of the Add Health dataset to examine variations in identified race between school, home, and parental report. Hitlin et al. (2006) utilized the Add Health data set Waves 1 and 3 in order to investigate the relationship between self-reported race (not racial identity) and ecological factors.

Harris & Sim (2002) examined the percentages of individuals reporting a multiracial background at school, at home, then a separate calculation based on parental racial/ethnic background. The focus of the Harris & Sim (2002) analysis was of multiracial individuals who were part White and part non-White. The first analysis conducted by Harris & Sim (2002) was with Wave 1 data looking at the individual level responses and how they changed or stayed the same across contexts; this analysis included 11,531 respondents. For those individuals reporting to be multiracial at either school or home, 1.1% reported the same multiracial background at both home and school compared to 86.5% of monoracial individuals reporting the same monoracial identity at home and school. For those individuals that did not report the same multiracial background at both home and school, 5% reported one race at home and more than one at school while 2% reported more than one race at home and one at school.

The second set of analyses was conducted by using the parental race/ethnicity to determine child race/ethnicity. Parental race/ethnicity was determined by only selecting adolescents that live with more than one biological parent and whose parents do not have

the same reported racial group (Harris and Sim, 2002). Almost 7% of individuals reported being multiracial at school, almost 4% at home, and almost 5% based on parental background. When examining different multiracial groups, there are also different patterns between school, home, and parent. For those who are Black and White, school and home reported race was the same at .6% while race based on parental calculation was .3%. For those who are Asian/White, .6% reported as such at school, .4% at home, and .9% based on calculation on parental background. For American Indian/White youth, 2.4% reported at school, 1.5% at home, and 2.4% based on parent's race.

Results from the Hitlin et al. (2006) analysis reveal many interesting findings. First, the number of individuals reporting more than one race at both Waves 1 and 3 was 159. The number of individuals reporting one race at one time and more than one race at another was 631, with approximately half identifying with one race at Wave 1 then more than one at Wave 3 and the other half identifying with more than one race at Wave 1 and one race at Wave 3. The largest group of individuals who selected more than one race at Wave 1 then selected one race only at Wave 3 were those who had selected both White and American Indian backgrounds (n=130) and then chose White as their race at Wave 3. Other changes mentioned in the Hitlin et al. (2006) analysis include those individuals who identified as both Black and White at Wave 1 (n=36) then selected one race only at Wave 3; of these, most chose Black only at Wave 3, as opposed to those who chose White only at Wave 3 (1%). For those who selected both Asian and White at Wave 1 (n=33) then selected one race at Wave 3, most selected Asian (n=22) as opposed to White only (n=11).

Hitlin et al. (2006) then looked at those individuals who selected one race at Wave 1 then added one or more races at Wave 3. Of those who selected one race at Wave 1 then added one or more races at Wave 3, the largest group of those were those who selected White at Wave 1 then selected White and American Indian at Wave 3 (n=181). Of those that selected Black only at Wave 1, nineteen went on to add White at Wave 3 and 42 added American Indian. For those individuals who report Asian only at Wave 1, twenty-nine of those selected both Asian and White at Wave 3.

In an attempt to determine if those who change racial categories are different in regard to self-esteem than those who do not change racial categories, a logistic regression was conducted. The odds ratio for self esteem and switching races was .92 ($p < .001$), however, it is not clear if this is self esteem at Wave 1 or Wave 3. This odds ratio indicates that switching is slightly more likely among those having lower self esteem. Further, the educational background of the mother was also significantly related to the odds of switching, .81 ($p < .001$) (switchers more likely to have mothers with lower education) as was the percent of the neighborhood that is White (based on census tracts) .57 ($p < .01$) (switchers more likely to live in neighborhoods with low percentages of Whites).

In a study by Coleman & Carter (2007), it was those biracial individuals who reported their identity shifting from situation to situation or not identifying racially at all who had the highest levels of anxiety and depression, compared to those biracial individuals who did not report situational identities. So it is unclear whether or not situational or shifting identity over time has a positive, negative, or null impact.

Based on these Add Health data and the reviewed literature, it is unclear as to whether or not a situational or changing identity is beneficial or not beneficial for the multiracial individual. While some literature indicates that changing or situational identity may have negative outcomes (Coleman & Carter, 2007; Hitlin et al., 2006) qualitative work indicates that it may have positive outcomes/benefits (Fuji Collins, 2000; Miville et al, 2005).

Functions of Racial Identity

Multiracial individuals theoretically have several options for racial identity, identifying with the ethnic group(s) of their mother, father, both groups, neither group, or with other individuals of multiracial descent. Racial identity can be measured in categories (e.g., Asian identity or minority identity) or in levels (highly identified versus low racial identity). A large body of work has been devoted to theory development for racial/ethnic identity and how it functions for different groups. Racial identity is different from ethnicity, in that it is having pride in one's racial and cultural identity (Sue, 1981). Racial identity can be important to individuals because it helps to form attitudes toward self and others (Poston, 1990).

One of the most frequently used racial identity theories is the Nigrescence theory by Cross which was originally developed in 1971. Cross's theory has been widely applied to various groups including Latinos, Asian Americans, and gay and lesbian groups (Cross & Strauss, 1998). According to Cross & Strauss (1998), there are five functions of racial identity in every day life with each of these functions being associated with different thoughts and feelings. The five functions are buffering, bonding, bridging,

code switching, and individualism. The function of interest in this particular study is that of buffering. Buffering is the function that protects individuals from negative encounters, specifically thought to be racist encounters. This function is thought to create a type of “buffer zone” when avoiding negative encounters is not possible and to act as a “filter.” While Cross’s theory was developed with the African American experience in mind, negative encounters related to race or status also occur with other groups, hence the success of the application of this model to other groups.

The buffering function of racial identity has been thought to be the core of the research literature on stigma (Cross & Strauss, 1998). In a pilot study by Cross & Strauss (1998) with 10 African Americans, they found that buffering was significantly related to being in stressful situations. Stressful situations related to race is not an uncommon occurrence in the lives of multiracial individuals. In a qualitative study by Fuji Collins (2000), he found that all 15 individuals interviewed indicated they had negative racial encounters. Further, there is an entire body of literature related to multiracial individuals that focuses on the “What are you?” experience, which is at most times a negative racial experience that is frequently experienced by multiracial individuals (Williams, 1996).

Suzuki-Crumly & Hyers (2004) investigated the differences in ethnic identity among multiracial adults. Specifically, they attempted to determine if different types of identity among Black/White and Asian/White individuals had differential benefits. Results of the study revealed that minority identified individuals were better off psychologically, regardless of ethnic group, than those individuals that did not identify with either of their ethnic backgrounds. While investigating if a majority (White) identity

was related to psychological well being was a goal of the authors, not enough individuals identified as White only to conduct an analysis.

Having a positive racial identity has been thought to buffer the negative effects of racism (Cross, 1991). Multiracial individuals are thought to have several options for racial identity with some identities being potentially more beneficial to the multiracial individual than other identities (Suzuki-Crumly & Hyers, 2004). Given that racial identity has been found to be related to psychological well being in biracial individuals it is not far fetched to believe that there may be a relationship between racial/ethnic identity and risk behaviors and such a relationship has been found in initial studies with both monoracial and multiracial samples (Caldwell, Sellers, Bernat, & Zimmerman, 2004; Brook & Pahl, 2005; Choi, Harachi, Gilmore, & Catalano, 2006).

Biracial/Multiracial Identity Development Models

In an interview by Lewis (2006), a biracial woman reflects back on her experience of how she identified over the years. “Up until adolescence, I thought of myself as white. In my teenage years and twenties, I thought of myself as black. And as thirtysomething and on, I thought of myself as biracial (p. 89).” However, not all biracial individuals have changes in identity over time, as illustrated by one multiracial woman who says she always identified herself as Black, even at a young age (Lewis, 2006). Others’ identity is continually contextual/situational where they identify with whatever group they are around (Schiff & O’Neill, 2007). But changes in how one sees oneself can occur at any time and are not necessarily coinciding with developmental milestones. For example, several individuals interviewed by Lewis (2006) note that a simple change in physical

location can cause one to “to trigger a reevaluation on matters of race” (p.255). These changes in environment or situations are similar to Cross’s Encounter phase where something serves to trigger a change. For example, in a qualitative study of racial identity development of two biracial women, they found that the participants could identify a specific event that caused them to begin to think of themselves in multiracial terms and to begin examining their identity, yet these experiences did not occur until young adulthood in these examples (Schiff & O’Neill, 2007).

While few models exist for racial identity development for the multiracial individuals, two models stand out within the literature for biracial individuals that are not specific to particular racial/ethnic groups. Both Poston (1991) and Root (1990) have begun to develop models of identity development for the biracial individual. Since they are both similar models, the Poston model will be reviewed here.

Poston’s (1991) model prefaces with the fact that it is based on scarce research on biracial individuals and should be viewed in context of Cross’s notion of reference group orientation. This model of racial identity development is a five stage model where stage one is termed Personal Identity and posits that persons at this stage are typically quite young and ethnic group membership is just now becoming salient for the individual. In context of reference group orientation, their attitudes have not yet formed so that their identity is mostly based on things such as self-esteem. The second stage is termed Choice of Group Categorization where the biracial individual is forced to choose an identity, typically the identity being the one of the ethnic minority group. Poston (1990) posits that it is at this point that the biracial individual may be at crisis and feel alienated from others. At this stage Poston posits that it would be “unusual for an individual to

choose a multiethnic identity, since this requires some level of knowledge of multiple cultures and a level of cognitive development beyond that which is characteristic of this age group (p. 154)” (Poston, 1990). The third stage is Enmeshment/Denial which is recognized by the confusion and guilt the biracial person experiences when deciding on an identity that is not representative of who they are. The biracial individual at this stage is characterized by guilt, self hatred, and rejection from one or more groups. It is at this point where intervention can help the biracial individual move through this stage and resolve their feelings. The fourth stage of Poston’s model is Appreciation. This stage is characterized by the individual appreciating the fact that they have multiple identities and their reference group orientation becomes widened. While this recognition is taking place it does not necessarily mean that they are identifying with more than one group, simply that they may begin to explore and learn about their other racial/ethnic heritage. Lastly, the fifth stage of the model is Integration. At this point the biracial individual has a sense of “wholeness” and recognizes and values all of their identities. It is at this point that racial identity is secure and integrated into the person.

Of the racial identity models that exist for biracial and multiracial individuals, they all share two common propositions. First, that multiracial individuals have stress and conflict in related to their racial identity. Second, that a final stage of identity development involves the acceptance and integration of their racial identities.

Unlike monoracial individuals, multiracial individuals typically lack role models or similar peer groups with which to identify. Having role models and similar peer groups can be important to children and adolescents who are beginning to form their identity in order to understand how they fit into society and where to gain social support when

negative racial experiences are encountered (Shih & Sanchez, 2005). This may be even more important for multiracial individuals as they frequently experience discrepancies between how society views them and how they view themselves, sometimes referred to as the “What Are You” experience. It is this type of experience that places the multiracial individual in a position of having to justify their identity to others, an experience that is frequently reported in the multiracial literature.

An important aspect of racial identity is the sense of belonging to the group (Ahnallen et al., 2006). If an individual feels like they belong to a group then their sense of identity with that group is validated and they feel valued, needed, and accepted (Anhallen et al., 2006). In contrast however, while one may identify with a particular group, that group may exclude that person from the group, leading to feelings of isolation or confusion about where one belongs. However, little research has been conducted to look at how feelings of belonging and exclusion impact racial identity. Regardless, Anhallen et al. (2006) suggest that what research is available on mixed race individuals does in fact suggest that these could be crucial variables in the development of the multiracial persons’ racial identity.

In an interview by Lewis (2006) a family situation of how race plays out was described. Of Black/White fraternal twins, one is more Black in appearance and the other is more White in appearance. The twin who was more White in appearance noticed at an early age that people interacted with her differently than with her sister. Not just strangers but also people in their own family. The twin who was more White in appearance would hear comments from her Black grandmother about why couldn’t she be more Black, more like her sister (in appearance). However, being more White in

appearance provided her with advantages that her sister did not have so as a result, she began to act out so that family members would like the other sister better, the sister who was more Black in appearance (Lewis, 2006).

It may be that for those multiracial persons who struggle with their identity during adolescence, in part due to their appearance, they have no buffer for the racism for which they encounter, no mechanism of how to deal with these issues that are unique to them when there is typically not a multiracial reference group with which to bond with. Even siblings may not provide this as siblings do not always physically appear the same with some Asian/White individuals appearing White while their sibling may appear Asian (Schiff & O'Neill, 2007). And if this is the case, there may be an increased frequency of encounters with racism for the multiracial individual who experiences no buffer for these negative encounters.

For those individuals who do not appear to be multiracial, who are less ambiguous in appearance, they may struggle more psychologically with the continual encounters of having to “prove” to others that they are legitimately “X” and the continual feeling of being envious of others who appear to be more ethnic in appearance than themselves (Schiff & O'Neill, 2007). However, for others, they may have a racial group with which they identify with but may be perceived by others as being part of another racial/ethnic group due to ambiguity in appearance, which may lead to distress. Comments a biracial Black/White woman who has always identified herself as Black:

I look like whoever I'm standing next to,” said Ashley. “If I'm standing in a group of Italian girls, people will think I'm a white Italian. If I'm standing next to Latina girls, they'll think I'm Latina. If I'm standing next to Middle Eastern girls,

they'll think I'm Middle Eastern. No one ever thinks I'm black though. (Lewis, 2006, p. 78)

In contrast, some multiracial people have difficulty with their identity, actively acknowledging that they were never sure where they belonged (Johnson, 1999).

Rockquemore & Brunnsma (2008) propose what they call a typology of racial identification for multiracial individuals of Black/White descent. This typology consists of four separate types of identification styles, using their terminology, (1) singular identity (2) border identity (3) protean identity (4) transcendent identity. Further, for the border identity they differentiate among two subtypes, validated and unvalidated.

According to Rockquemore & Brunnsma (2008), the singular identity is identifying with only one racial group, in this typology it would be only Black or only White only. A border identity is what they refer to as a biracial identity, which consists of validated and unvalidated biracial identities. The term border identity specifically comes from the work of Gloria Anzaldua (2007), who originally published this work in 1987. Having a border identity is one who sits on both sides of the border, never fully being on either side and is characterized by restlessness. While this is the focus of how Anzaldua (2007) has used this term, Rockquemore & Brunnsma (2008) appear to be defining this border identity differently. Specifically, a border identity is proposed to be one where the multiracial person doesn't "...consider themselves to be either black or white, but instead incorporate both "blackness" and "whiteness" into a separate hybrid category of self-reference" (p.43). How this is defined seems to be conceptually different from how Anzaldua's terminology has been applied in previous work, where sitting in the border was as if one never really fit in anywhere but was sitting from a different perspective.

However, Rockquemore & Brunnsma (2008) appear to view this proposed typology as a more positive one, which should be noted. In their study of Black/White multiracial individuals, they report that 58% of their sample identified with this category. The authors go on to describe this particular typology as "...a third and separate category that draws from both of these group characteristics and has some additional uniqueness in its combination (p.44)." It is difficult to distinguish if the authors are referring to an identity where the individual psychologically identifies as both black and White and multiracial or as biracial only. While the original terminology uses the words "either black or white" and "both" it would appear that the individual psychologically identifies as bicultural as opposed to biracial. But given that this typology is framed with specific reference to only one type of multiracial individual, it may be that this distinction is not necessary.

However, it is necessary to point out that identifying with both of your racial/ethnic backgrounds is in fact different than identifying with biracial persons in general.

The validated border identity is distinguished from the unvalidated border identity in the fact that those who are unvalidated are seen by society as Black (or White) and are treated as such, with the exception of close friends and family accepting the biracial identity. These two distinctions were made on their survey by the following statements "I consider myself biracial, but I experience the world as a black person" for unvalidated border identities and "I consider myself exclusively as biracial (neither black nor white)" for validated border identity. Authors further report that the unvalidated type "...are more likely to report their cultural, political, physical, and bureaucratic identity (i.e., the identity they select on forms) as "black" rather than as "biracial." (p.45).

A protean identity is where biracial individuals identify themselves with whatever group they are with at that time and feel validated by and accepted as a member of that group. So, when interacting with a group of Black individuals, the person with a protean identity would identify as Black and feel as if they were accepted by the individuals they are interacting with as a legitimate member of the group. The same would apply if they were interacting with White individuals. The authors further go on to state that when with a heterogeneous group of individuals, they would identify themselves as biracial and would feel accepted by others as being biracial. This is what past researchers have termed as situational identity but have not further distinguished it as being accepted by the group one is interacting with.

Lastly, the transcendent typology is characterized by the biracial person not identifying with either of their racial backgrounds and instead rejecting the notion of race. Basically, these individuals are simply not racially identified. Some researchers may consider this as a White identity. While others would consider them simply non identified.

Rockquemore & Brunnsma (2008) specifically address current thought amongst multiracial theorists that there is a multiracial identity, where the multiracial person identifies with multiracial persons in general. Rockquemore & Brunnsma (2008) call this a “misguided assumption” based on the results of their data and reject the notion that the biracial person may just identify with multiracial persons in general, going as far as to call it the “myth of multiracial identity.” However, since their typology is proposed for Black/White individuals it is not clear if they reject this notion for just Black/White individuals or for all biracial individuals.

Racial Identity and Risk Behaviors

Racial identity is different from ethnicity, in that it is having pride in one's racial and cultural identity (Sue, 1981). Racial identity can be important to individuals because it helps to form attitudes toward self and others (Poston, 1990). Given the potential for increased strife for multiracial individuals, the negotiation of racial identity may put multiracial individuals at greater risk for engaging in risk behaviors. An association between racial identity and risk behaviors has also been proposed and these variables have been found to be related in monoracial ethnic groups. Specifically, it has been suggested that high levels of racial identity could possibly lower one's risk in engaging in behaviors such as alcohol and drug use (Caldwell et al., 2004; Choi et al., 2006).

High levels of racial identity are possibly related to lowering one's risk in engaging in risk behaviors. This idea is specifically supported by what Caldwell et al. (2004) refer to as the resiliency perspective. The resiliency perspective purports that when there is one protective factor in place, it enhances the effects of a second protective factor, which in turn, results in protection against risk behaviors. Racial identity, risk factors, and buffering appear to be related by a complex relationship where buffering enhances psychological protective factors and buffers against psychobehavioral risks (Brook & Pahl, 2005). Specific studies and data that lead researchers to this hypothesis include work by Zickler (1999), Castro & Morgan-Lopez (1999) (cited in Choi et al., 2006). In Zickler's (1999) work there was the finding that adolescents with a strong ethnic identity were at lower risk for drug use, while Castro & Morgan-Lopez's (1999) work found that strong ethnic identity was related to positive response to tobacco programs than those with a lower sense of ethnic identity (cited in Choi et al., 2006). So,

given these and other data, there is a strong argument that racial identity can reduce risk by creating more resilient individuals (Choi et al., 2006).

However, there are little data examining this relationship (Brook & Pahl, 2005; Marsiglia, Kulis, Hecht, & Sills, 2004). The majority of data that do exist for racial identity and its relationship to alcohol or drug use is with monoracial individuals. Without an examination of what factors may contribute to risk behaviors among multiracial groups, this can lead to stereotypes about racial/ethnic groups (Marsiglia et al., 2004).

It has been proposed that racial identity could have a protective effect against certain types of risk behaviors for individuals within minority groups (Marsiglia et al., 2004). In a study by Caldwell et al. (2004), an academically at risk sample of African American adolescents was investigated. The Multidimensional Inventory of Black Identity (MIBI) was used in order to assess ethnic identity. Of note, the MIBI assesses aspects of ethnic identity, such as private regard and centrality. Private regard refers to feelings toward Blacks while centrality refers to how much being Black is central to one's definition of themselves. In relation to findings about ethnic identity, regression analyses revealed that individuals high on private regard (positive feelings) had lower reports of alcohol use. Racial centrality and alcohol were not found to be related. However, there was an interaction between private regard and racial centrality and this relationship was related to lower reports of alcohol use.

While the Caldwell et al. (2004) study looked at a sample of monoracial adolescents, a study by Brook & Pahl (2005) looked at a sample of monoracial adults. The Brook & Pahl (2005) study measured ethnic identity using five variables that they

state reflect an Africentric orientation. These five variables are familism, church attendance, affiliation, identification, and affirmation/belonging. In this study, authors hypothesized that being highly identified as African American (using the five variables) would serve as a buffer to drug use. Linear regressions revealed that only some of the Africentric orientation variables were significant. Specifically, familism served as a buffer most often in the models while church attendance also was a buffer.

Pugh & Bry (2007) also posit that ethnic identity (similar to racial identity) is a “promising characteristic” (p. 187) for explaining why certain individuals may be protected from, engaging in behaviors such as drug use. Pugh & Bry (2007) examined how ethnic identity was related to alcohol and marijuana use in a sample of Black college students. In order to assess ethnic identity, the authors used the Multigroup Ethnic Identity Measure-Revised by Phinney (1992). Interestingly, ethnic identity scores tended to increase across classes, where freshmen had the lowest ethnic identity and seniors the highest.

Pugh & Bry (2007) conducted regression analyses controlling for year in school, gender, and substance use by friends. Results of the analyses revealed several interesting findings. Ethnic identity accounted for 31% of the variance for beer/hard liquor use and resulted in an interaction of ethnic identity and year in school. While ethnic identity did in fact have a protective impact against use of beer and hard liquor, it had the most protective effect on freshmen, then sophmores and juniors, then seniors. However, ethnic identity only accounted for 6% of the variance for wine use and 4% of the variance for marijuana use. The authors suggest that since ethnic identity appears to be a protective factor against certain behaviors, that it may be best to cultivate this during one’s life.

Further, the authors suggest that a longitudinal study be conducted with an examination of more variables to really determine how ethnic identity protects against risk behaviors.

Marsiglia, Kulis, & Hecht (2001) conducted a study to investigate drug use between ethnic groups in a group of seventh graders. Of specific interest to the authors was how ethnic identity could predict the use of drugs. The authors attempted to measure ethnic identity using two different methods, one which they term ethnic behavior, and the other termed ethnic pride. The ethnic behavior variable measures items related to behavior, speech, and looks. Whereas the ethnic pride variable measures items related to how important one's ethnic group is to the individual and what it means to be a part of one's ethnic group. The primary distinction between these two measures of ethnic identity is that one is behavioral and the other is more psychological in nature. While this study looked at both monoracial and multiracial individuals, the following will focus on the monoracial individuals only and the multiracial individuals will be discussed in the next section.

One analysis conducted in the Marsiglia et al. (2001) study utilized an ordinary least squares regression in order to predict the number of days in the last month that individuals used alcohol, tobacco, marijuana, and hard drugs. Results revealed that ethnic pride was significantly related to predicting the number of days in the last month that individuals used alcohol (1.51), tobacco (1.71), marijuana (1.19), and hard drugs (.56). More detailed analyses by racial/ethnic group reveal that for African Americans and Mexican Americans, high ethnic pride was related to lower alcohol use (-2.7, -2.16). For tobacco use, high ethnic pride for Mexican Americans was related to less use (-1.58). High ethnic pride was also related to less marijuana use for African Americans (-3.46)

and Mexican Americans (-1.48). Less use of hard drugs was also significantly related to ethnic pride for African Americans (-1.88). However, ethnic behavior was not related to alcohol, tobacco, marijuana, or hard drug use for African Americans or Mexican Americans. Interestingly, White individuals with high levels of ethnic pride were significantly more likely to use drugs than those White individuals with low ethnic pride.

Marsiglia et al. (2004) conducted a study to determine if ethnic identity serves as a protective factor against drug use in a group of monoracial and multiracial adolescents. The focus here is on the results for monoracial adolescents, the multiracial adolescents will be discussed in the next section. In this study, over four thousand seventh graders were surveyed. In the survey, the specific risk behaviors measured were alcohol, tobacco, marijuana, and other drugs. The results of this study reveal that the degree of ones ethnic identity, as measured by the study, revealed a relationship to risk behaviors. First, a series of regressions were conducted to examine lifetime drug use. Results of this analysis revealed that ethnic identity was significantly related to various risk behaviors. For Mexicans, high ethnic identity was related to more lifetime alcohol, cigarette, and number of different drugs ever used, but not to lifetime marijuana use. For Other Latino's, ethnic identity was not related to lifetime usage. For African Americans, only lifetime cigarette use was significantly related to high ethnic identity, meaning that high ethnic identity was related to an increased amount of lifetime cigarette use. Lastly, for American Indians, high ethnic identity was related to more lifetime alcohol, cigarette, and marijuana use, and number of different drugs ever used.

The second set of analyses focused on a series of regressions to examine current drug use, defined as in the last 30 days. The results of this set of analyses revealed a

similar pattern of findings as the lifetime use analyses. For those who identify as Mexicans, a high degree of ethnic identity was related to drinking more alcohol, smoking more cigarettes, and the frequency of use of alcohol, cigarettes, and marijuana. For those who identify as Other Latino's, a strong sense of ethnic identity was protective against smoking and frequency of use of alcohol, cigarettes, and marijuana. For African Americans, ethnic identity was not related to alcohol, cigarettes, or marijuana use. For American Indians, strong ethnic identity was related to alcohol and cigarette use and frequency of alcohol, cigarette, and marijuana use.

Results from the Caldwell et al. (2004), Brook & Pahl (2005), Pugh & Bry (2007), Marsiglia et al. (2001), and Marsiglia et al. (2004) studies have limited consistency. While there was evidence found that racial/ethnic identity can serve as a buffer against engaging in risk behaviors, results were mixed. Caldwell et al. (2004) found that the interaction of racial centrality and private regard were related to lower alcohol use among monoracial adolescents. Similarly, Marsiglia et al. (2001) found that high ethnic pride was related to less use of alcohol, tobacco, marijuana, and hard drugs. Marsiglia et al. (2004) also found ethnic identity to be protective of current cigarette use and frequency of use for Other Latino's.

However, Pugh & Bry (2007), Brook & Pahl (2005), and the majority of Marsiglia et al.'s (2004) research found more mixed results. Both Brook & Pahl (2005) and Pugh & Bry (2007) found that only some of their racial/ethnic identity variables (familism, church attendance) protected against only certain risk behaviors (drug use, beer, liquor) while other variables were not protective (affiliation, identity, affirmation/belonging). In contrast, Marsiglia et al. (2004) found that a strong sense of

ethnic identity was related to increased alcohol, cigarette, and marijuana usage currently and over one's lifetime for most of the groups examined. The authors discussed above note that while findings are sometimes mixed, that self report of racial identity should not be disregarded. Further, self report should be combined with some measure of racial identity. The fact that there are mixed results cannot be explained by the researchers. Some believe that the mixed findings are due to possibly the particular substance that is being studied while others believe that more complex models are needed in order to fully explain all of the factors that contribute to these findings.

In sum, for monoracial groups there is some evidence of a protective effect due to racial/ethnic identity with regard to alcohol, tobacco, and other drug use. However, the study results are inconsistent as are the operational definitions of racial identity. Nevertheless, this limited evidence may or may not be applicable to multiracial individuals. The following section examines findings on multiracial groups, racial identity, and risk behaviors.

Multiracial Individuals, Racial Identity, and Risk Behaviors

While the majority of work that has been conducted on multiracial individuals and risk behaviors consists of descriptive work, there have been a handful of studies that have attempted to investigate factors that are related to risk behaviors. Without an examination of what factors may contribute to or mediate risk behaviors among racial groups, this can lead to misconceptions and stereotypes about different racial groups (Marsiglia et al., 2004).

In a study conducted by Choi et al. (2006) with multiracial and monoracial adolescents, researchers expected multiracial individuals with higher levels of ethnic identity to be less likely to engage in risk behaviors. The Multigroup Ethnic Identity Measure was utilized in this particular study to measure ethnic identity and regression models controlling for low income, age, and gender were tested. Of note, researchers used multiracial individuals of American Indian and African American backgrounds as the reference group. Results of the Choi et al. (2006) study revealed that for multiracial individuals, high levels of ethnic identity were associated with lower reports of use of crack or cocaine and lower reports of frequent use of substances. However, ethnic identity was not related to having ever smoked, having ever drank alcohol, having ever used marijuana, ever sniffing glue/gas/paint, and having ever gotten drunk or high on drugs.

Marsiglia et al. (2001) conducted a study to investigate drug use among ethnic groups in a group of seventh graders. Of specific interest to the authors was how ethnic identity could predict the use of drugs². A method employed in this study in regard to ethnicity was that the authors allowed participants to self identify with an ethnic label using a checklist to answer which group participants believed they belonged to. The authors do not indicate that multiple responses were allowed for selection of an ethnic label. The choices provided for ethnic labels included the following: Chinese/Chinese American, Japanese/Japanese American, Black/African American, Mexican American/Hispanic/Chicano/Latino, White/Anglo-American, Native American/American Indian, Mixed Heritage, and Other.

² For details on how ethnic identity was measured, see earlier description.

Multiracial individuals in this study were found to have started to use drugs at a significantly earlier age than the other ethnic groups ($M = .14$, $SD = .34$, $N = 408$) $r(406) = -.09$, $p < .05$). Further, in the ordinary least squares regression, multiracial individuals who had high levels of ethnic behavior reported using hard drugs more frequently than those multiracial individuals who reported lower levels of ethnic behavior ($b = 1.25$, $p < .05$, $N = 393$). Multiracial individuals who had higher levels of ethnically consistent behavior also had significantly more drug offers than multiracial individuals with lower levels of ethnically consistent behavior. However, when examining results using the ethnic pride part of ethnic identity, results revealed that multiracial individuals ($b = -3.20$, $p < .01$, $N = 393$) with high levels of ethnic pride had significantly lower levels of alcohol use than those who had low levels of ethnic pride. Further, multiracial individuals with high levels of ethnic pride had lower reported levels of using tobacco than those who had low levels of ethnic pride.

Given the measures used in this study, it appears that ethnic behaviors, speech, and looks tends to be related to higher engagement in risk behaviors. While higher levels of ethnic pride tend to be associated with lower levels of engagement in risk behaviors. Of note is that the ethnic behavior, speech, and looks scale assessed the "...degree to which students felt their behaviors, speech, and looks were consistent with those of others from their ethnic group, and the degree to which their friends came from the same group." (p. 30). While ethnic pride was

...indicating the degree to which (1) they thought about what it means to be from their ethnic group, (2) their ethnic group was important to them, (3) they knew the history of their group, (4) they talked to other group members to learn more

about their ethnic group, (5) they thought that members of their group looked better than others; (6) they felt good about being a member of the group, and (7) they would choose to be a member of the group if given a choice. (p.30)

What remains unclear within this study is what ethnic group that multiracial individuals were thinking of when asked this question. For example, they could be thinking of their maternal ethnic group, paternal ethnic group, some other ethnic group, or multiracial as an ethnic group.

Marsiglia et al. (2004) also examined multiracial individuals in their study of ethnic identity and its relationship to risk behaviors. Similar to their results for monoracial individuals, ethnic identity was related to certain behaviors. For Mexican mixed race individuals, a strong sense of ethnic identity was related to lifetime alcohol use and the number of different drugs ever used. However, for other multiracial individuals, ethnic identity was not related to lifetime alcohol, cigarette, or marijuana use; nor was it related to number of different drugs ever used. For current use, a high degree of ethnic identity was related to alcohol and frequency of use for multiracial Mexicans. For Other multiracial individuals ethnic identity was not related to current use of alcohol, cigarettes, marijuana, or frequency of use.

Methodologically, a large portion of the reviewed studies (Beal et al. 2001; Caetano & McGrath, 2005; Udry et al. 2003; Whaley & Francis, 2006) either fail to mention how they assessed mixed race status or, wrongly label mixed race individuals as being identified (different than heritage) as mixed race by using racial self-report; which has been shown to be unreliable and problematic (Harris & Sim, 2002). And while there have been some empirical risk health behavior studies that have included individuals of

multiracial descent, they are limited and are predominantly focused on the adolescent population. Further, there have only been a very limited number of empirical studies (Udry et al. 2003; Whaley & Francis, 2006) conducted where individuals of multiracial descent were not aggregated together. Aggregating multiracial individuals may be masking differences within multiracial individuals and assumes that all multiracial individuals share the same experiences. Disaggregating multiracial groups and investigating the relationship of racial identity to risk behaviors using a national sample is critical to understanding the current situation.

Because multiracial individuals theoretically have several options for racial identity, racial identity is thought to be potentially problematic and a source of stress for multiracial individuals, and because racial identity is thought to serve as a buffer to risk behaviors (Caldwell et al. 2004; Choi et al. 2006), research should be conducted with multiracial adults examining if particular multiracial groups are at higher risk for alcohol, tobacco, and drug use than other multiracial groups. Also, there should be an examination of the relationship of racial identity and risk behaviors longitudinally. Specifically, is racial identity a protective factor against risk behaviors and second, is switching of racial identity over time related to risk behaviors.

In light of recent national data that have shown high rates of alcohol, tobacco, and illicit drug use in multiracial individuals, the aggregation of individuals of multiple racial/ethnic backgrounds into one category, and the seriousness of engaging in risk health behaviors, research is needed to more precisely understand this problem. Given the reviewed literature, it appears that there is in fact some kind of relationship among multiracial individuals, risk behaviors, and racial identity. The purpose of the study is to

provide a methodologically sound examination of the relationship between racial identity and high-risk health behaviors in a longitudinal sample of multiracial individuals. The risk health behaviors of interest include alcohol, tobacco, and illicit drug use.

Conceptual Framework

In order to frame the study, the following conceptual model was used (Figure 1). The model is based upon literature from Racial Identity Theory. Specifically racial identity theory will be used to explain how racial identity can potentially protect multiracial individuals from the risk behaviors of focus. Multiracial individuals can identify with the racial group of their mother, father, both parental groups, neither parental group, or with other individuals of multiracial descent. Racial identity has been thought to serve as a protective factor against many behaviors for minority individuals. Given that multiracial individuals theoretically have a wide range of options for racial identification, how racial identity does or does not serve as a protective factor against risk behaviors is not clear.

CHAPTER 3: METHODOLOGY

Purpose

The purpose of the current research is threefold. The first purpose is to determine if particular groups of multiracial individuals (e.g., Asian/White, African American/White) are at a higher risk for alcohol, tobacco, and drug use than other multiracial groups. The second purpose is to determine the relationship between racial identity and risk behaviors. And the third purpose is to determine if the change/no change of race/racial identity longitudinally is related to the likelihood of engaging in risk behaviors. In order to achieve these purposes, a national data set containing multiracial individuals with data on risk behaviors (alcohol, tobacco, illicit drug use) and social and demographic data was obtained for secondary analysis.

Overview and Type of Research

Add Health: The National Longitudinal Study of Adolescent Health Waves I, II, and III was used to conduct analyses. This particular data set was selected because it is unique in that the race variable is not aggregated for individuals of multiracial descent (i.e., all multiracial individuals are not grouped as “Other” or some other indiscernible group), multiracial respondents are asked “Which one category best describes your racial background?” (which can serve as a proxy for racial identity), and because it is a

longitudinal data set. The Add Health project is a national longitudinal study that follows adolescents into adulthood, is conducted by the UNC Carolina Population Center, and is funded by the National Institute of Child Health and Human Development. The design of the study used a stratified random sampling of all high schools within the United States (Harris, Florey, Tabor, Bearman, Jones, & Udry, 2003). Schools were stratified by region, city size, school size, school type, percent white, percent black, educational levels covered, and type of school (Harris et al., 2003). A total of 80 high schools were included in the study. Participants were enrolled during the 1994-1995 school year and were between seventh and twelfth grade. After initial contact, participants were then followed up at one, two and six years post high school. In addition to the respondent level data, Add Health also collects data from the respondents' parents, brothers, sisters, schoolmates, school personnel, and romantic partners.

Data Construction

Figure 2 shows the configuration of questions regarding race and racial identity that are available from the Add Health data set. Individuals not eligible for inclusion within the study were identified as anyone who was a legitimate skip for the racial identity variable both Waves 1 and 3 (see Appendix A and B for a list of survey questions used in the analysis). A legitimate skip for the racial identity variable was defined as not selecting more than one race.

Creating Variables For Those Who Are Multiracial

A variable was created in order to identify those individuals who selected more than one race at both waves, those individuals who selected one race at wave 1 and then selected more than one race at Wave 3 (monoracial to multiracial), and those individuals who selected more than one race at wave 1 and selected one race at wave 3 (multiracial to monoracial). As a follow up to this variable, a dichotomous variable that indicated change or no change in race across the waves was created. A third variable was then created to identify those individuals whose racial identity changed or remained the same between waves. The variables for change in race and change in racial identity were created independent of each other. A variable was created to identify those individuals whose racial identity, different from race, changed or remained the same between waves. Individuals who reported being multiracial (race) at both time points were considered to be a no changer in their race since they viewed themselves as multiracial at both time points. Then it was determined if their racial identity was the same at both Waves or different at each Wave. If it was the same at each wave, they were classified as having a non changing racial identity. If it was different at each wave, it was classified as having a changing racial identity. However, if an individual selected only one race at one time point and more than one race at another time point, they were automatically classified as having a changing racial identity since they were viewing themselves differently between time points. For example, if an individual selected Black as their race for Wave 1 and then Black, White, and American Indian as their race for Wave 3, that person would be classified as a changer for racial identity. However, if an individual identified as two different multiracial races (e.g., Hispanic/Asian/White at Wave 1 then

Hispanic/Asian/Black at Wave 3) but selected the same racial identity (Black) at both Waves, then they were classified as being a no changer for racial identity. A third example: if one identifies as White for their race at Wave 1, then American Indian/White as their race at wave 3, and selects White as their racial identity at Wave 3, they are classified as a changer because of the addition of a race at Wave 3. It is the psychological stability in both race and racial identity that creates the change variable.

Descriptive data for multiracial individuals provided by Add Health (prior to having the data) are provided in Tables 1- 3. Demographic data for multiracial individuals once the data were received and analyzed are provided in Table 4. Table 1 consists of those individuals who responded to the question, “ What is your race?”, by selecting more than one race at *both* Waves 1 and 3; for those individuals, Table 1 shows what racial identity was selected in response to the follow up question, “Which one category best describes your racial background?” Table 2 shows the number of individuals that reported a different race between waves and in what direction the change occurred. Table 3 displays the breakdown of where the largest changes occurred within the changes between waves 1 and 3.

There are 18 categories on which Add Health collects data, these are: diet, physical activity, health-service use, morbidity, injury, violence, sexual behavior, contraception, sexually transmitted infections, pregnancy, suicidal intentions/thoughts, substance use/abuse, runaway behavior, height, weight, pubertal development, mental health, and chronic and disabling conditions (Harris et al., 2003). For the current research, the category of focus is substance use/abuse.

Research Questions/Hypotheses

Research Question 1: Are multiracial groups more likely to engage in risk behaviors than multiracial individuals who identify their race as White?

Hypothesis 1: Likelihood of risk behaviors will not vary by racial group.

Research Question 2: For multiracial individuals, is racial identity a protective factor against risk behaviors? For example, is an Asian/White individual who identifies as Asian less likely to engage in risk behaviors than an Asian/White individual who identifies as White?

Hypothesis 1: Racial identity does not vary by multiracial group. Specifically, the proportion who identify as a minority will not vary by multiracial group.

Hypothesis 2: Individuals who racially identify with a minority group will be less likely to and will have lower rates of engaging in risk behaviors compared to individuals who identify with Whites.

Research Question 3: Are changes in racial identity in multiracial individuals over time associated with risk behaviors? There is no specific hypothesis for this research question as the purpose of this question is to determine if change or no change are at all related to risk behaviors.

The current study utilized demographic and substance use/abuse data from Add Health for those individuals who are identified as multiracial. The dependent variable for all analyses is the use of tobacco, alcohol, and illicit drugs and the rate of use (see Appendix A and B). The specific independent variable of interest for research question 1 is multiracial group (e.g., Asian/White; African American/White) and the dependent variables are alcohol, tobacco, and drug use. The independent variable of interest for

research question 2 is racial identity (e.g., minority vs. White) and the dependent variables are alcohol, tobacco, and drug use. Lastly, the independent variable for research question 3 is change or no change in racial identity while the dependent variables are alcohol, tobacco, and drug use. The study was reviewed and approved by the Institutional Review Board (see Appendix C) on September 19, 2007 under the title, Racial Identity and Risk Behaviors in Mixed Race Individuals.

Analytic Approaches

Figures 2 and 3 illustrate the theoretical relationships among the variables of interest for research questions. For research question 1, “Are multiracial groups more likely to engage in risk behaviors than the multiracial group that identify their race as White?” the hypothesis that was tested is “Likelihood of risk behaviors will not vary by multiracial group.” To test the hypothesis, a series of logistic regression analyses were performed, each with the independent variable being multiracial group category and the dependent variable being the proportion reporting use of alcohol, drugs, or tobacco. Age and sex were controlled for at Wave 1. Age, sex, and education were controlled for at Wave 3. Second, a series of Analyses of Covariance (ANCOVA) were conducted to examine level of usage of alcohol, tobacco, and drugs per multiracial group category. Demographic variables (age, sex, and education) were controlled for and marginal means are reported.

For research question 2, “For multiracial individuals, is racial identity a protective factor against risk behaviors?” (see Figure 2) two hypotheses were tested: a) racial identity does not vary by multiracial group and b) individuals who racially identify with a

minority group will have lower proportions and index rates of engaging in risk behaviors compared to individuals who racially identify with a non-minority group. The first hypothesis was tested using a Chi-square to determine the proportions among the racial groups that were minority and White identified. To test the second set of hypotheses, a series of logistic regressions was performed, each with the independent variable being multiracial group category and the dependent variable being the proportions who are minority and White identified. Age and sex were controlled for at Wave 1 while age, sex, and education were controlled for at Wave 3. Second, a series of ANCOVAs were conducted to examine amount of substance use. Demographic variables (age, sex, and education) were controlled for and marginal means are reported.

Lastly, research question 3 examines whether change in racial identity in multiracial individuals is associated with risk behaviors (see Figure 3). As shown in Figure 3, individuals were grouped into two distinct categories, those who changed their self reported race and those who did not change their self reported race between Waves 1 and 3. The individuals who changed their reported race between Waves 1 and 3 were combined with those individuals who did not change their reported race between waves but did change their racial identity between waves. Again, a series of logistic regressions and ANCOVAs were run to test research question 3. Demographic variables were controlled for in both sets of analyses (age, sex, education) and marginal means are reported.

Data Analyses

Analyses were conducted using data from the Add Health study (see Appendix A and B). For research question 1, the first set of analyses consisted of descriptive statistics regarding alcohol, tobacco, and illicit drug use for each group. For hypothesis 1 logistic regression analyses were used to examine the relationship between multiracial group and alcohol, tobacco, and illicit drug use.

For research question 2, a Chi-square test, logistic regression analysis and ANCOVA were conducted in order to look at the proportions identified as (1) minority and White identified and (2) the relationship of minority versus White identified individuals who engage in tobacco, alcohol, and drug use and to examine the amount of use of tobacco, alcohol, and illicit drugs.

The second series of analyses focused on the longitudinal portion of the study, testing research question 3. Logistic regression analyses and ANCOVAs were conducted to determine if and how the fluctuation (e.g., rates of switching) of racial identity over time is/is not related to engagement in risk behaviors for each of the multiracial ethnic groups and if the relationship is particularly salient for certain groups.

According to the Guidelines for Analyzing Add Health Data (Chantala, 2006), weights should be used when analyzing data from Add Health due to the sample design. Specific issues regarding the sample design that require the use of weights include the oversampling of specific ethnic groups and socioeconomic statuses. Weights were created by the Add Health office. Weights for Wave 1 and Wave 3 were used in the current analyses. Specifically, the Wave 1 weight adjusts for the probability of an adolescent being selected from the enrollment rosters of schools during 1994-1995. The

Wave 3 weight adjusts for Wave 1 respondents who were interviewed at Waves 2 and 3.

Unweighted analyses can be found in Appendix D through N.

CHAPTER 4: RESULTS

Research Question 1

Research Question 1: Are multiracial groups more likely to engage in risk behaviors than those multiracial individuals who identify their race as White?

H1: Odds of risk behavior will not vary by multiracial group.

To narrow down the number of different racial groups presented for the analyses related to research question 1, the five largest racial groups at each wave were selected to be included in the analysis³. The five largest unweighted racial groups at wave 1 were Hispanic/Asian/White (n=264), American Indian/White (n=260), White (n=206), Black/White (n=142), and Asian/White (n=125). The five largest unweighted groups at wave 3 were American Indian/White (n=288), White (n=176), Black (n=140), Asian/White (n=119), and Black/White (n=95). Characteristics of the groups at Wave 1 and at Wave 3 are provided (see Table 4).

In order to test research question 1 hypothesis 1, a series of logistic regressions were conducted for use/no use of the substance of interest. The independent variable was multiracial group while the dependent variables examined were tobacco, alcohol, and drug use. Coding of race for Wave 1 was 1 (Black/White), 2 (Asian/White), 3 (American

³ Note that inclusion in the study required reporting being multiracial at either Wave 1 or Wave 3. Therefore, there are monoracial groups in both Waves 1 and 3 when examining race as a variable. However, they are still considered a multiracial group for the purpose of analyses since they report being multiracial at one Wave.

Indian/White), 4 (Hispanic/Asian/White), and 5 (Whites). Coding of race for Wave 3 was 1 (Black/White), 2 (Asian/White), 3 (American Indian/White), 4 (Black), and 5 (White).

Because a portion of the multiracial sample selected White as their race in both Waves 1 and Waves 3, White was selected to be the reference group at both Waves 1 and 3 due to their presence at both Waves for ease of reporting and interpretation of analyses.

Tobacco

Research Question 1a: Are multiracial groups more likely to engage in smoking than those multiracial individuals who identify their race as White?

H1: Odds of smoking will not vary by multiracial group.

Descriptive statistics for tobacco use by racial group for both Waves 1 and 3 are provided (see Table 5).

Contrary to the hypothesis, the odds for the race variable significantly differed from 1, indicating that this variable is associated with reports of ever having smoked a cigarette at Wave 1 (see Table 6). Specifically, all multiracial groups (excluding Hispanic/Asian/White's) were less likely than White's to report having ever smoked a cigarette at Wave 1. Contrary to the hypothesis, the odds for the race variable significantly differed from 1, indicating that this variable is associated with reports of ever having smoked cigarettes regularly at Wave 1 (see Table 6). Specifically, American Indian/White individuals were more likely to have reported smoking cigarettes regularly than White individuals. Black/White, Asian/White, and Hispanic/Asian/White

individuals were less likely to report having smoked cigarettes regularly at Wave 1 compared to Whites.

Overall, at Wave 1, results reveal that most multiracial groups, with the exception of Hispanic/Asian/White individuals were less likely than White's to have reported ever having smoked a cigarette. When examining reports of having smoked cigarettes regularly, American Indian/White individuals were more likely to have reported smoking cigarettes regularly than White individuals. However, Black/White, Asian/White, and Hispanic/Asian/White individuals were less likely to report having smoked cigarettes regularly at Wave 1 compared to Whites.

Contrary to the hypothesis, there was a statistically significant association of race and having reported ever trying smoking (see Table 6). Specifically, American Indian/White individuals were more likely to report having tried smoking than White individuals. However, Black/White, Asian/White, and Black individuals were less likely to report having ever tried smoking than White individuals. Contrary to the hypothesis, there was a statistically significant association of race and having ever smoked regularly at Wave 3 (see Table 6). Specifically, Black individuals were less likely to have smoked compared to White individuals. However, Black/White, Asian/White, and American Indian/White individuals were more likely to have smoked regularly than White individuals. Contrary to the hypothesis, there was a statistically significant association of multiracial groups and having smoked in the past 30 days at Wave 3 (see Table 6). Specifically, Black/White, Asian/White, American Indian/White, and Black individuals were all less likely to have smoked in the past 30 days than White individuals.

Overall, at Wave 3, results revealed that while American Indian/White individuals

were more likely to have ever tried smoking than White individuals; Black/White, Asian/White, and Black individuals were less likely to have ever tried smoking than White individuals. However, when examining smoking regularly, while Black individuals were less likely to have smoked regularly compared to White individuals, Black/White, Asian/White, and American Indian/White individuals were more likely to have smoked regularly when compared to White individuals. When examining smoking behavior in the past 30 days, Black/White, Asian/White, American Indian/White, and Black individuals were all less likely to have smoked in the past 30 days compared to White individuals.

Overall, results for tobacco use reveal that multiracial groups tend to be less likely to have ever smoked a cigarette at Wave 1 and to have ever smoked regularly, with the exception being American Indian/White individuals. At Wave 3, all groups with the exception of American Indian/White individuals were less likely to have ever tried smoking than Whites. But, all multiracial groups except those selecting Black as their race, were more likely to smoke regularly than Whites. In contrast, multiracial individuals and Black individuals were all less likely to have smoked in the past 30 days compared to White individuals.

Alcohol

Research Question 1b: Are multiracial groups more likely to engage in alcohol use than those multiracial individuals who identify their race as White?

H1b: Odds of alcohol use will not vary by multiracial group.

Descriptive statistics of alcohol use by racial group for both Waves 1 and 3 are provided (see Table 7).

Contrary to the hypothesis, there was a statistically significant association between the multiracial groups and having ever drunk beer, wine, or liquor more than 2 or 3 times in their life (see Table 8). Specifically, all multiracial groups, except Black/White individuals, were more likely to have responded they drank alcohol more than 2 or 3 times in their life compared to White individuals. Black/White individuals were less likely to have responded that they drank alcohol more than 2 or 3 times in their life. Contrary to the hypothesis, there was a statistically significant association for the multiracial groups and having drunk alcohol outside of the family (see Table 8). Specifically, all multiracial groups were less likely to have drunk alcohol outside of their family compared to White individuals.

Overall, there was a trend for multiracial individuals to be more likely than multiracial White identified individuals to have drunk alcohol more than 2 or 3 times in their lives (with the exception of Black/White individuals). However, when asked about drinking outside of the family, all multiracial groups were less likely than White individuals to have ever drunk alcohol outside of the family.

Contrary to the hypothesis, there was a statistically significant association for multiracial groups and having drunk alcohol more than 2-3 times since June 1995 (see Table 8). Specifically, results varied for having drunk alcohol more than 2 or 3 times since June 1995. Among the groups more likely to have drunk alcohol more than 2 or 3 times since June 1995 than White individuals, were Black/White individuals and American Indian/White individuals. Among the groups less likely to have drunk alcohol

more than 2 or 3 times since June 1995 than White individuals, were Asian/White individuals and Black individuals.

Specifically, results varied for having drunk alcohol more than 2 or 3 times since June 1995. Of the groups more likely to have drunk alcohol more than 2 or 3 times since June 1995 than White individuals, were Black/White individuals and American Indian/White individuals. Of the groups less likely to have drunk alcohol more than 2 or 3 times since June 1995 than White individuals, were Asian/White individuals and Black individuals.

Results from both waves are complex. While multiracial individuals were more likely than White individuals to have drunk alcohol more than 2 or 3 times in their life time (with the exception of Black/White individuals) Wave 3 results revealed that two multiracial groups were more likely to have drunk alcohol more than 2 or 3 times since June 1995, Black/White and American/Indian White individuals. Asian/White and Black individuals were less likely to have drunk more than 2 or 3 times since June 1995 compared to White individuals.

Illicit Drugs

Research Question 1c: Are multiracial groups more likely to use illicit drugs than those multiracial individuals who identify their race as White?

H1c: Odds of illicit drug use will not vary by multiracial group.

Descriptive statistics for marijuana use by racial group for both Waves 1 and 3 are provided (see Table 9).

Marijuana

Contrary to the hypothesis, there was a significant association for multiracial groups for ever having used marijuana (see Table 10). Specifically, all multiracial groups were more likely to have used marijuana compared to White individuals. Contrary to the hypothesis, there was a statistically significant association for multiracial individuals and use of marijuana since June 1995 (see Table 10). Specifically, all multiracial and Black individuals were less likely to have used marijuana since June 1995 compared to White individuals. Contrary to the hypothesis, there was a statistically significant association for multiracial individuals and use of marijuana in the past year (see Table 10). Specifically, all multiracial individuals and Black individuals were more likely to have used marijuana in the past year compared to White individuals.

Overall, results for marijuana use reveal contrasting results. Specifically, at Wave 1 all multiracial groups were more likely to have used marijuana than White individuals. However, at Wave 3, all multiracial groups and Black individuals were less likely to have used marijuana since June 1995 compared to White individuals. Further, while likelihood to use marijuana was less at Wave 3, likelihood to have used marijuana at Wave 3 in the past year was higher for multiracial individuals (and Black individuals) than compared to White individuals.

Cocaine

Research Question 1c: Are multiracial groups more likely to engage in cocaine use than those multiracial individuals who identify their race as White?

H1c: Odds of cocaine use will not vary by multiracial group.

Descriptive statistics for cocaine use by racial group for both Waves 1 and 3 are provided (see Table 11).

Contrary to the hypothesis, there was a statistically significant association for multiracial individuals and use of cocaine (see Table 12). Specifically, each of the multiracial groups were less likely to have used cocaine than those who selected White at Wave 1. However, the confidence interval for Asian/White's contains the null value of 1, so the odds are even for this group to report using cocaine compared to those who selected White at Wave 1.

Contrary to the hypothesis, there was a statistically significant association for multiracial individuals and use of cocaine since June 1995 (see Table 12). Specifically, each multiracial group and Black individuals were less likely to have used cocaine since June 1995 than were White individuals. Contrary to the hypothesis, there was a statistically significant association for multiracial individuals and use of cocaine in the past year (see Table 12). Specifically, with the exception of American Indian/White individuals, each multiracial group was more likely to have used cocaine in the past year compared to White individuals. The American Indian/White individuals were less likely to have used cocaine in the past year than White individuals.

Overall, results for cocaine indicate that at both Waves 1 and 3, multiracial groups were less likely to ever have used cocaine (and Black individuals at Wave 3), than were White individuals. However, when looking at cocaine use in the past year, the only multiracial group to have been less likely than White individuals to have used in the past year were American Indian/White individuals. All other multiracial groups were more likely to have used cocaine in the past year compared to White individuals.

Inhalants/Crystal Meth

Research Question 1c: Are multiracial groups more likely to engage in inhalant/crystal meth use than those multiracial individuals who identify their race as White?

H1c: Odds of inhalant/crystal meth use will not vary by multiracial group.

Descriptive statistics for inhalant/crystal meth use by racial group for both Waves 1 and 3 are provided (see Table 13).

Contrary to the hypothesis, there was a statistically significant association for multiracial groups and use of inhalants (see Table 14). Specifically, each multiracial group (except Hispanic/Asian/White individuals) was more likely to have used inhalants than White individuals. Hispanic/Asian/White individuals were less likely to have used inhalants.

Contrary to the hypothesis, there was a statistically significant association for multiracial groups and the use of crystal meth since June 1995 (see Table 14). Specifically, Black/White and Asian/White individuals were less likely than White individuals to have used crystal meth since 1995. However, American Indian and White and Black individuals were more likely to have used crystal meth since 1995 than White individuals. Contrary to the hypothesis, there was a statistically significant association for multiracial groups and use of crystal meth in the past year at Wave 3 (see Table 14). Specifically, each multiracial group was more likely to have used crystal meth in the past year than White individuals. Black individuals were less likely to have used crystal meth in the past year than White individuals.

Overall analysis of inhalant use was limited to one question at Wave 1 and the results of that analysis revealed that all multiracial groups (except Hispanic/Asian/White

individuals) were more likely to have used inhalants than White individuals. The Hispanic/Asian/White individuals were less likely to have reported using inhalants.

At Wave 3, crystal meth was assessed instead of inhalants. Overall the results reveal that there were differences between the groups and whether or not they had reported using crystal meth since 1995, with American Indian/White and Black individuals being more likely to have used than White individuals while Black/White and Asian/White individuals were less likely to report use than White individuals (see Table 14). However, when looking at crystal meth use in the past year, all of the multiracial groups were more likely than White individuals to have reported using crystal meth in the past year. The only individuals that were less likely to have reported using crystal meth in the past year were Black individuals.

Other Illegal Drugs

Research Question 1c: Are multiracial groups more likely to engage in other illegal drug use than those multiracial individuals who identify their race as White?

H1c: Odds of other illegal drug use will not vary by multiracial group.

Descriptive statistics of other illegal drug use by racial group for both Waves 1 and 3 are provided (see Table 15).

Contrary to the hypothesis, there was a statistically significant relationship for multiracial groups and the use of other illegal drugs at Wave 1 (see Table 16).

Specifically, while Asian/White individuals were more likely to have reported use of other illegal drugs compared to White individuals, each of the other multiracial groups were less likely to have reported use of other illegal drugs than White individuals.

Contrary to the hypothesis, there was a statistically significant association for multiracial groups and reported use of other illegal drugs at Wave 3 (see Table 16). Specifically, Black/White and Black individuals were less likely to have reported use of other illegal drugs since 1995 than White individuals. However, Asian/White individuals were more likely to have reported use of other illegal drugs since 1995. Contrary to the hypothesis, there was a statistically significant association for multiracial groups and reported use of other illegal drugs within the past year at Wave 3 (see Table 16). Specifically, each multiracial group and Black individuals were more likely to have reported use of other illegal drugs within the past year than White individuals.

Research Question 2

Research Question 2: For multiracial individuals, is racial identity a protective factor against risk behaviors?

For research question 2 two hypotheses were tested: a) racial identity does not proportionally vary by multiracial group and b) individuals who racially identify with a minority group will have lower odds and rates of engaging in risk behaviors compared to individuals who racially identify with a non-minority group. To test the first hypothesis, a Chi square analysis was performed with the independent variable being multiracial group category and the dependent variable being the proportion who were minority and White identified.

To test the likelihood (hypothesis 2b) of minority versus White identified engaging in substance use, a series of logistic regressions were performed, each with the independent variable being minority and White identification and the dependent variable

being each substance. Second, a series of ANCOVAs was conducted to examine rate of use for each of the substances.

Research Question 2, H1: Racial identity does not vary by multiracial group

To test if racial identity varies by multiracial group, a chi-square was used. A non significant Chi-square was expected for the sample. The proportions of minority versus White identity for each group are reported in Table 17 and the demographics are reported in Table 18. Contrary to the hypothesis, participants were not equally likely to identify with a minority group as with a majority group within both Wave 1, $\chi^2(64, N=870,544) = 1,257,258.92, p=.000$ and Wave 3, $\chi^2(33, N=755,915) = 914,352.22, p=.000$.

Research Question 2, Hypothesis 2: Individuals who racially identify with a minority group will be less likely and will have lower rates of engaging in risk behaviors compared to individuals who identify with Whites.

To test if individuals who racially identify with a minority group would have lower odds of engaging in substance use compared to individuals who racially identify with a non-minority group, a series of logistic regressions was performed, each with the independent variable being minority and White identification and the dependent variable being the particular risk behavior. Age and sex were controlled for in Wave 1; and in Wave 3 age, sex, and education were controlled for. Minority identification was coded as a 1 while White identification was coded as a 0. Descriptive statistics for tobacco, alcohol, and drug use are provided.

Tobacco

R2: For multiracial individuals, is racial identity a protective factor against risk behaviors?

H2a: Individuals who racially identify with a minority group will have lower odds and rates of engaging in tobacco use compared to individuals who identify with Whites.

Descriptive statistics for tobacco use by group identification for both Waves 1 and 3 are provided (see Table 19).

Contrary to the hypothesis, there was a statistically significant association of racial identity and having ever reported smoking cigarettes at Wave 1 (see Table 20). While minority identified individuals were more likely to have reported ever smoking than were White identified individuals, the confidence interval contains the null value of 1. Contrary to the hypothesis, there was a statistically significant association of racial identity and having reported smoking cigarettes regularly at Wave 1 (see Table 20). Specifically, minority identified individuals were more likely to have reported smoking cigarettes regularly at Wave 1 than White identified individuals.

Contrary to the hypothesis, there was a statistically significant association of racial identity and having reported ever trying cigarette smoking at Wave 3 (see Table 20). Specifically, minority identified individuals were more likely to have reported ever having tried cigarette smoking at Wave 3 than White identified individuals. Contrary to the hypothesis, there was a statistically significant odds ratio for racial identity and having reported ever smoking regularly in the past 30 days at Wave 3 (see Table 20). Specifically, minority identified individuals were more likely to have reported smoking regularly in the past 30 days at Wave 3 than were White identified individuals. Contrary

to the hypothesis, there was a statistically significant association of racial identity and having reported smoking in the past 30 days at Wave 3 (see Table 20). Specifically, minority identified individuals were more likely to have reported having smoked in the past 30 days at Wave 3 than were White identified individuals.

Consistent with the hypothesis, minority and White identified individuals who ever smoked regularly differed significantly on the number of days they reported smoking in the last 30 days at Wave 1 $F(1, 424,708) = 6479.96, p = .000$ (see Table 21). Specifically, minority identified individuals reported having smoked a fewer number of days ($M = 9.24$) than did White identified individuals ($M = 12.35$). Consistent with the hypothesis, minority and White identified individuals who reported ever smoking regularly differed significantly on the number of cigarettes they reported to have smoked each day within the last 30 days $F(1, 274,769) = 10623.691, p = .000$ (see Table 21). Specifically, minority identified individuals who reported having ever smoked regularly, reported having smoked fewer cigarettes each day ($M = 5.12$) compared to White identified individuals ($M = 8.45$).

Consistent with the hypothesis, there was a significant difference between minority and White identified individuals, who reported ever smoking regularly and having smoked in the past 30 days, on the number of days they reported smoking in the past 30 days at Wave 3 $F(1, 347,561) = 5187.30, p = .000$ (see Table 21). Specifically, minority identified individuals reported having smoked a fewer number of days ($M = 23.67$) than did White identified individuals ($M = 26.06$). Consistent with the hypothesis, there was a significant difference between minority identified and White identified individuals, who reported ever smoking regularly and reported smoking in the past 30

days, regarding the number of cigarettes smoked each day in the past 30 days $F(1, 347,052) = 14404.74, p = .000$ (see Table 21). Specifically, minority identified individuals who reported having ever smoked regularly and reported having smoked in the past 30 days, reported having smoked a fewer number of cigarettes per day ($M = 9.26$) than White identified ($M = 14.37$) individuals who reported having ever smoked regularly and reported having smoked in the past 30 days.

Overall, results show that minority identified individuals are significantly more likely to have reported ever smoking (Wave 3 only), reported regular smoking (both Waves), and reported smoking in the past 30 days (Wave 3) compared to White identified individuals. However, results for frequency of use of tobacco show that minority identified individuals report smoking a significantly fewer number of days and report smoking a significantly fewer cigarettes per day at both Waves compared to White identified individuals.

Alcohol

R2: Individuals who racially identify with a minority group will be less likely to and have lower rates of engaging in risk behaviors compared to individuals who identify with Whites.

H2b: Individuals who racially identify with a minority group will be less likely to and have lower rates of engaging in alcohol use compared to individuals who identify with Whites.

Descriptive statistics for alcohol use by group identification for both Waves 1 and 3 are provided (see Table 22).

Contrary to the hypothesis, there was a statistically significant association for racial identity and having had a drink of beer, wine, or liquor more than 2 or 3 times in their life at Wave 1 (see Table 23). Specifically, minority identified individuals were more likely to report having drank more than 2 or 3 times in their life compared to White identified individuals. Contrary to the hypothesis, there was a statistically significant association for racial identity and having ever drank beer, wine, or liquor when not with parents or other adults in the family (see Table 23). Specifically, minority identified individuals were more likely to have reported drinking outside of their family compared to White identified individuals.

At wave 3, participants were asked if they had had a drink of beer, wine, or liquor more than two or three times since June 1995 (Wave 1). However, drinking outside of the family was not measured at Wave 3. Contrary to the hypothesis, there was a statistically significant association for racial identity and having drank more than 2 or 3 times since June 1995 (see Table 23). Specifically, minority identified individuals were more likely to have reported drinking more than 2 or 3 times since June 1995 than White identified individuals.

Consistent with the hypothesis, there was a significant difference between minority identified and White identified individuals, who reported having ever drank and the number of drinks they reported to usually have each time they have drank $F(1, 457,371) = 26.02, p = .000$ (see Table 24). Specifically, minority identified individuals tended to report drinking a fewer number of drinks ($M = 6.00$) than did White identified individuals ($M = 6.12$).

Consistent with the hypothesis, there was a significant difference between minority identified and White identified individuals, who reported ever drinking more than 2-3 times since June 1995 and in the past 12 months, and the reported number of drinks they have had each time they have drunk in the last 12 months $F(1, 580,925) = 1397.11, p < .000$ (see Table 24). Specifically, minority identified individuals tended to report drinking a fewer number of drinks ($M = 4.21$) than did White identified individuals ($M = 4.54$).

Overall, results reveal that minority identified individuals were significantly more likely to report having had more than 2 or 3 drinks at both waves and to report having drunk outside of the family at Wave 1 compared to White identified individuals. However, results for frequency of use reveal that minority identified individuals report drinking a fewer number of drinks when drinking at both Waves 1 and 3 compared to White identified individuals.

Illicit Drugs

R2: Individuals who racially identify with a minority group will be less likely to and have lower rates of engaging in risk behaviors compared to individuals who identify with Whites.

H2c: Individuals who racially identify with a minority group will be less likely to and have lower rates of engaging in illicit drug use compared to individuals who identify with Whites.

Descriptive statistics of illicit drug use by group identification for both Waves 1 and 3 are provided (see Table 25).

Marijuana

Consistent with the hypothesis, there was a statistically significant association for racial identity and marijuana use at Wave 1. Specifically, minority identified individuals were less likely to have reported ever using marijuana than were White identified individuals (see Table 26).

Contrary to the hypothesis, there was a statistically significant association for racial identity and reporting ever having used marijuana since June 1995 (see Table 26). Specifically, minority identified individuals were more likely to have reported using marijuana since Wave 1 than were White identified individuals.

Consistent with the hypothesis, there was a statistically significant association for racial identity and ever having used marijuana in the past year at Wave 3 (see Table 26). Specifically, minority identified individuals who had reported use of marijuana since June 1995 were less likely to have reported use of marijuana in the past year than White identified individuals.

Contrary to the hypothesis, there was a significant difference between minority identified and White identified individuals and lifetime marijuana use at Wave 1. Specifically, minority identified individuals ($M = 55.78$) were more likely to have reported using marijuana more times during their lifetime at Wave 1 $F(1, 292,954) = 3907.48, p < .000$ compared to White identified individuals ($M = 30.21$) (see Table 27). Contrary to the hypothesis, there was a significant difference between minority identified and White identified individuals and past 30 day marijuana use at Wave 1 (see Table 27). Specifically, minority identified individuals ($M = 17.14$) reported using marijuana significantly more times in the past 30 days than White identified individuals ($M = 6.99$)

$F(1, 321,268) = 1876.66, p = .000$ at Wave 1. In contrast to the Wave 1 results, Wave 3 results reveal that minority identified individuals ($M = 10.60$) report using marijuana less often in the last 30 days than White identified individuals ($M = 13.07$) $F(1, 298893) = 368.14, p = .000$ (see Table 27).

Overall, results reveal that minority identified individuals were less likely to have reported ever using marijuana at wave 1. However, those that did report use of marijuana at Wave 1 reported use of marijuana more frequently than White identified individuals. Wave 3 results reveal that minority identified individuals were more likely to have reported ever using marijuana since June 1995 however they were less likely to have reported use of marijuana in the past year than White identified individuals. Further, minority identified individuals reported use of marijuana less frequently than White identified individuals during the past 30 days at Wave 3.

Cocaine

Wave 1 analysis of cocaine use included the question “How old were you when you tried any kind of cocaine-including powder, freebase, or crack cocaine-for the first time?” If you never tried cocaine, enter “0.” A variable was created to reflect yes/no use of cocaine. Anyone responding with a 0 was coded as no and anyone responding with an age at which they had tried cocaine was coded as a 1, indicating yes (see Appendix for list of questions).

Contrary to the hypothesis, there was a statistically significant association for racial identity and having ever used cocaine at Wave 1 (see Table 29). Specifically,

minority identified individuals were more likely to have reported ever having tried cocaine than were White identified individuals.

At Wave 3, cocaine use since June 1995 and cocaine use during the past year were measured. If participants responded that they had not used cocaine-including crack, freebase, or powder since June 1995, they were not asked or included in the analysis for whether or not they had used any kind of cocaine in the past year. Consistent with the hypothesis, there was a statistically significant association for racial identity and reporting having used cocaine since June 1995 (see Table 29). Specifically, minority identified individuals were less likely to have reported use of any kind of cocaine since June 1995 than were White identified individuals. Consistent with the hypothesis, there was a statistically significant association for racial identity and having used cocaine in the past year at Wave 3 (see Table 29). Specifically, minority identified individuals were less likely to have reported use of cocaine in the past year than were White identified individuals.

Contrary to the hypothesis, there was not a significant difference between White identified individuals ($M = 2.49$) and minority identified individuals ($M = 2.52$) and their reported lifetime cocaine use at Wave 1 $F(1, 33349) = 1.25, p = .263$ (see Table 30).

Lifetime use of cocaine was not measured at Wave 3.

Contrary to the hypothesis, minority identified individuals ($M = 1.37$) reported significantly more use of cocaine in the past 30 days than White identified individuals ($M = .67$) $F(1, 52243) = 1740.26, p < .000$ at Wave 3 (see Table 30). Cocaine use in the past 30 days was not measured in the same manner as in Wave 3 and thus not analyzed.

Overall, results reveal that minority identified individuals were more likely to have reported having tried cocaine at Wave 1 than White identified individuals. However, there was no statistical difference between the two groups for reported lifetime use of cocaine at Wave 1. Results for use of cocaine at Wave 3 reveal that minority identified individuals were less likely to have reported having used cocaine and were less likely to have reported use of cocaine in the past year. However, minority identified individuals reported use of cocaine significantly more often in the past 30 days than White identified individuals at Wave 3.

Other Illegal Drugs

Descriptive statistics for other illegal drug use by group identification for both Waves 1 and 3 are provided (see Table 31). Analysis of the use of other illegal drugs at Wave 1 required creating a variable to reflect a yes/no categorization. Individuals who responded that they had never tried any other type of illegal drug were coded as 0 for no and individuals who indicated at what age they tried any other type of illegal drug was coded as a 1 for yes.

Contrary to the hypothesis, there was a statistically significant association for racial identity and reported use of other illegal drugs at Wave 1. Specifically, minority identified individuals were more likely to have reported using other illegal drugs at Wave 1 than were White identified individuals (see Table 32).

Analysis of the use of other types of illegal drugs at Wave 3 did not include anyone who responded no to the previous question, if they had ever used any other types of illegal drugs since June 1995. Contrary to the hypothesis, there was a statistically

significant association for racial identity and the reported use of other illegal drugs since June 1995 (see Table 32). Specifically, minority identified individuals were more likely to have reported use of other illegal drugs since June 1995 than were White identified individuals. Consistent with the hypothesis, there was a statistically significant association for racial identity and the reported use of other illegal drugs in the past year at Wave 3 (see Table 32). Specifically, minority identified individuals who had reported use of other illegal drugs since June 1995 were less likely to have reported use of other illegal drugs in the past year compared to White identified individuals who had reported use of other illegal drugs since June 1995.

In order to examine lifetime use of other illegal drugs, only those individuals who had reported ever having used other illegal drugs were included in the analysis, anyone who responded with a zero was excluded. Frequency of use of illegal drugs within the past 30 days was assessed at both Waves 1 and 3. Individuals who responded that they had not used other illegal drugs within the past 30 days were excluded from the analyses.

Contrary to the hypothesis, there was a significant difference between minority and White identified individuals and reported lifetime use of other illegal drugs at Wave 1. Specifically, minority identified individuals ($M = 82.21$) reported use of other illegal drugs more often in their lifetime compared to White identified individuals ($M = 17.92$) $F(1, 81354) = 3024.08, p = .000$ (see Table 33). Lifetime use of other illegal drugs was not measured at Wave 3.

Consistent with the hypothesis, there was a significant difference between minority and White identified individuals and reported use of other illegal drugs within the past 30 days at Wave 1. Specifically, minority identified individuals who had

reported having used other illegal drugs in the past 30 days reported use of other illegal drugs less frequently ($M = 1.82$) compared to White identified individuals ($M = 2.08$) $F(1, 84191) = 76.17, p = .000$ (see Table 33).

Contrary to the hypothesis, there was a significant difference between minority and White identified individuals and reported use of other illegal drugs within the past 30 days at Wave 3. Specifically, White identified individuals ($M = 2.17$) who reported using other illegal drugs in the past 30 days reported using other illegal drugs less frequently than did minority identified individuals ($M = 3.67$) $F(1, 99595) = 2631.64, p < .000$ (see Table 33).

Overall, results reveal that minority identified individuals were more likely to report having used other illegal drugs at Wave 1 and to report having used them more frequently at Wave 1 compared to White identified individuals. However, when asked about their use of other illegal drugs within the past 30 days at Wave 1, they reported using other illegal drugs less frequently than did White identified individuals.

Results for Wave 3 reveal that while minority identified individuals were less likely to report having used other illegal drugs within the past year than White identified individuals, minority identified individuals reported using other illegal drugs more frequently during the past 30 days than did White identified individuals.

Inhalants/Crystal Meth

Descriptive statistics for inhalants/crystal meth by group identification for both Waves 1 and 3 are provided (see Table 34). Contrary to the hypothesis, there was not a statistically significant association for racial identity and the reported use of inhalants at

Wave 1. Use of inhalants was not measured at Wave 3, instead use of crystal meth was assessed.

Contrary to the hypothesis, there was a statistically significant association for racial identity and the reported use of crystal meth since June 1995 (see Table 35). Specifically, minority identified individuals were more likely to report having used crystal meth since June 1995 than were White identified individuals. However, consistent with the hypothesis, there was a statistically significant association for racial identity and the reported use of crystal meth in the past year. Specifically, minority identified individuals were less likely to have reported use of crystal meth within the past year compared to White identified individuals (see Table 35).

Consistent with the hypothesis, there was a significant difference between minority and White identified individuals and the frequency of the reported use of inhalants at Wave 1. Specifically, minority identified individuals ($M = 33.00$) reported having used inhalants fewer times in their lifetime at Wave 1 compared to White identified individuals ($M = 38.96$) $F(1, 60074) = 13.34, p < .000$ (see Table 36). However, contrary to the hypothesis, there was not a significant difference between minority and White identified individuals and their reported use of inhalants in the past 30 days at Wave 1 $F(1, 15086) = .576, p = .448$ (see Table 36).

Consistent with the hypothesis, there was a significant difference between minority and White identified individuals and reported use of crystal meth in the past 30 days at Wave 3. Specifically, minority identified individuals ($M = 1.68$) reported less frequent use of crystal meth within the past 30 days at Wave 3 compared to White identified individuals ($M = 2.93$) $F(1, 23433) = 1767.26, p = .000$ (see Table 36).

Overall, results reveal that there was not a difference in the reported use of inhalants at Wave 1 between the two groups. However, there was a difference in the reported frequency of inhalant use over their lifetime with minority identified individuals reporting less frequent use of inhalants than White identified individuals. Further, there was no difference between the two groups in the reported frequency of the use of inhalants in the past 30 days. Wave 3 analysis comprised of reported use of crystal meth. Results revealed that minority identified individuals were more likely to have reported having used crystal meth since June 1995 but were less likely to have reported having used crystal meth in the past year. Further, minority identified individuals reported having used a lesser amount of crystal meth during the past 30 days at Wave 3 than did White identified individuals.

Research Question 3

Research Question 3: Are shifts in racial identity⁴ in multiracial individuals over time associated with risk behaviors? There is no specific hypothesis for this research question

⁴ A variable was created to identify those individuals whose racial identity, different from race, changed or remained the same between waves. If an individual reported being multiracial (race) at both time points, they were considered to be stable in their race since they viewed themselves as a multiracial person at both time points. Then it was determined if their racial identity was the same at both Waves or different at each Wave. If it was the same at each wave, they were classified as having a stable racial identity. If it was different at each wave, it was classified as having an unstable racial identity.

However, if an individual selected only one race at one time point and more than one race at another time point, they were automatically classified as having an unstable racial identity since they were viewing themselves differently between time points.

For example, if an individual selected Black as their race for Wave 1 and then Black, White, and American Indian as their race for Wave 3, that person would be classified as a changer for racial identity.

However, if an individual identified as two different multiracial races (e.g., Hispanic Asian White at Wave 1 then Hispanic Asian Black at Wave 3) but selected the same racial identity (Black) at both Waves, then they were classified as having a stable racial identity.

A third example: if one identifies as White for their race at Wave 1, then American Indian and White as their race at wave 3, selects White as their racial identity at Wave 3, they are classified as a changer because of the addition of a race at Wave 3. It is the psychological stability in both race and racial identity that creates the change/no change variable.

as the purpose of this question is to determine if change is at all related to risk behaviors. Descriptive statistics are provided (see Table 37).

Logistic regression analyses were conducted to determine if those individuals whose race/racial identity changed or remained the same differed on the dependent variables. Individuals whose race/racial identity changed were coded as a zero while those whose race/racial identity did not change were coded as a one.

Tobacco

Descriptive statistics for tobacco use by change for both Waves 1 and 3 are provided (see Table 38). Based on logistic regression results, there was not a significant odds ratio for the change/no change variable and reporting having ever smoked a cigarette at Wave 1, indicating that this variable is not associated with reports of having ever smoked a cigarette at Wave 1. Based on logistic regression results, there was a significant odds ratio for the change/no change variable and reporting having smoked regularly at Wave 1, indicating that this variable is associated with having smoked regularly at Wave 1 (see Table 39). Specifically, those individuals whose race/racial identity did not change were more likely to have reported smoking regularly at Wave 1.

Based on logistic regression results, there was a significant odds ratio for the change/no change variable and reporting having ever tried cigarette smoking at Wave 3, indicating that this variable is associated with having ever tried cigarette smoking at Wave 3 (see Table 39). Specifically, those individuals whose race/racial identity did not change were less likely to have reported ever trying cigarette smoking at Wave 3 than those individuals whose race/racial identity did change. Based on logistic regression

results, there was a significant odds ratio for the change/no change variable and reporting having smoked regularly, indicating that this variable is associated with having smoked regularly (see Table 39). Specifically, those individuals whose race/racial identity did not change were less likely to have reported smoking regularly than those whose race/racial identity did change. Based on logistic regression results, there was a significant odds ratio for the change/no change variable and reporting having smoked in the past 30 days (see Table 39). Specifically, those individuals whose race/racial identity did not change were less likely to have reported smoking in the past 30 days than those whose race/racial identity did change.

Analysis of Wave 1 reported smokers and the number of days they reported smoking in the past 30 days reveals that individuals who had a change in their identity reported smoking cigarettes more days in the past 30 days ($M = 11.75$) compared to those who did not have a change in their identity between Waves ($M = 7.79$) $F(1, 509298) = 4935.76, p = .000$ (see Table 40). Analysis of Wave 1 reported smokers and the reported number of cigarettes smoked each day reveals that those who had a change in their identity ($M = 7.11$) were significantly more likely to report smoking more cigarettes each day compared to those who did not have a change in their identity between Waves ($M = 6.67$) $F(1, 326903) = 80.57, p = .000$ (see Table 40).

Analyses of tobacco use at Wave 3 show that those who reported smoking and had a change in identity between Waves were significantly more likely to report having smoked more days in the past 30 days ($M = 26.62$) than were those individuals who did not have a change in identity between Waves ($M = 23.11$) $F(1, 499117) = 10323.50, p = .000$ (see Table 40). Analyses of the number of reported cigarettes smoked each day

during the past 30 days revealed similar results to those found at Wave 1. Those who reported smoking and had a change in identity between Waves were significantly more likely to have reported smoking more cigarettes per day in the past 30 days ($M = 13.71$) compared to those individuals who did not have a change of identity between Waves ($M = 11.18$) $F(1, 498797) = 1639.51, p = .000$ (see Table 40).

Overall, results reveal a pattern for reported use of tobacco among those whose race/racial identity did and did not change. Specifically, while there was no difference between the two groups for reporting ever having tried smoking at Wave 1, there was a difference in whether or not they reported having smoked regularly, with the no changers being more likely to report smoking regularly than the changers. However, the no changers reported smoking a fewer number of days in the past 30 days than the changers and smoking a fewer number of cigarettes per day than the changers.

More consistently though, the no changers were less likely to have reported ever having smoked, reported smoking regularly, and reported having smoked in the past 30 days at Wave 3 compared to the changers. Further, the no changers reported having smoked a fewer number of days in the past 30 days and reported smoking a fewer number of cigarettes per day in the past 30 days at Wave 3 than the changers.

Alcohol

Descriptive statistics for alcohol use by change for both Waves 1 and 3 are provided (see Table 41). Based on logistic regression results, there was a significant odds ratio for the change/no change variable and having reported whether drinking alcohol more than 2-3 times at Wave 1, indicating that this variable is associated with having drunk alcohol

more than 2-3 times at Wave 1 (see Table 42). Specifically, those individuals whose race/racial identity did not change were less likely to have reported drinking alcohol more than 2-3 times than were those individuals whose race/racial identity did change. Based on logistic regression results, there was a significant odds ratio for the change/no change variable and drinking alcohol outside of the family, indicating that this variable is associated with drinking alcohol outside of the family (see Table 42). Specifically, those individuals whose race/racial identity did not change were more likely to have reported drinking outside of the family than those individuals whose race/racial identity did change.

Based on logistic regression results, there was a significant odds ratio for the change/no change variable and having reported use of alcohol since June 1995, indicating that this variable is associated with drinking alcohol since Wave 1 (see Table 42). Specifically, those individuals whose race/racial identity did not change were less likely to have reported drinking alcohol since June 1995 than those individuals whose race/racial identity did change.

The relationship between change/no change of race/racial identity and frequency of use of alcohol was examined at both Waves 1 and 3 (see Table 43). Results of the analysis reveal that there is a significant difference between those whose race/racial identity changed and those whose did not change between waves $F(1, 533978) = 86.64, p = .000$. Specifically, those individuals whose race/racial identity did change between waves ($M = 5.93$) reported drinking a lower frequency of drinks when they drink than those individuals whose race/racial identity did not change ($M = 6.25$).

Similar to the results at Wave 1, results of the analysis for Wave 3 reveal that there is a significant difference between those whose race/racial identity changed and those who did not change between waves $F(1, 1033500) = 792.89, p < .000$ (see Table 43). Specifically, those individuals whose race/racial identity did change between waves ($M = 4.66$) reported drinking a lower frequency of drinks when they drink than those individuals whose race/racial identity did not change ($M = 4.97$).

Overall, results reveal patterns for alcohol use. Specifically, no changers were less likely to have reported drinking more than 2 or 3 times at Waves 1 and 3. However, when examining rate of alcohol use, no changers were more likely to report drinking more drinks compared to the changers.

Illicit Drugs

Marijuana

Descriptive statistics for marijuana use by group identification for both Waves 1 and 3 are provided (see Table 44). Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of marijuana at Wave 1, indicating that there is a relationship with this variable (see Table 45). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of marijuana at Wave 1 than those individuals whose race/racial identity did change.

Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of marijuana at Wave 3, indicating that there is a relationship with this variable (see Table 45). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of marijuana

since June 1995 than those whose race/racial identity did change. Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of marijuana in the past year, indicating that there is a relationship with this variable (see Table 45). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of marijuana in the past year than those whose race/racial identity did change.

Reported frequency of marijuana use was assessed using ANCOVA for both Waves 1 and 3 (see Table 46). Reported lifetime use of marijuana at Wave 1 revealed no significant differences between those who changed their identity between waves ($M = 37.61$) compared to those individuals who did not change their identity between waves ($M = 38.56$) $F(1, 310797) = 3.67, p = .055$. The wave 1 analysis of the reported number of times marijuana was used in the last 30 days reveals that those individuals who had a change in identity between waves ($M = 5.53$) reported using marijuana significantly more times $F(1, 348074) = 941.93, p < .000$ than did those reported marijuana users who did not change their identity between waves ($M = 3.85$).

Reported lifetime use of marijuana was not measured at Wave 3. Analysis for reported frequency of use of marijuana in the past 30 days at Wave 3 showed that those individuals who did not have a change in identity and had reported use of marijuana in the past 30 days had reported using marijuana at a higher rate ($M = 21.98$) than did those individuals who did change identity between waves ($M = 9.67$) $F(1, 533303) = 13006.58, p < .000$.

Overall, results reveal a fairly consistent pattern for reported marijuana use. Specifically, the no changers were less likely to report having tried marijuana at Wave 1

and reported less use of marijuana in the past 30 days at Wave 1 than the changers.

There was no difference between changers and no changers in the reported number of times they had used marijuana in their lifetime at Wave 1. However, at Wave 3, while the no changers were less likely to have reported use of marijuana and to have reported using marijuana less in the past year, they reported using marijuana more frequently in the past 30 days than did the changers.

Cocaine

Descriptive statistics for cocaine use by group identification for both Waves 1 and 3 are provided (see Table 47).

Based on the review of the descriptive statistics, binary logistic regression for each of the independent variables (yes/no) were conducted with the following predictor variables: minority identified, age, sex, and for wave 3 education was included.

Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of cocaine at Wave 1 (see Table 48). Specifically, those individuals whose race/racial identity did not change were more likely to have reported use of cocaine than those whose race/racial identity did change.

Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of cocaine at Wave 3 (see Table 48). Specifically, those individuals whose race/racial identity did not change were more likely to have reported use of cocaine than those whose race/racial identity changed. Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of cocaine in the past year at Wave 3 (see Table 48).

Specifically, those whose race/racial identity did not change were more likely to have reported use of cocaine in the past year than those whose race/racial identity changed.

Reported lifetime cocaine use was measured at Wave 1 but not at Wave 3.

Reported past 30 day use of cocaine was measured at Wave 3 but not at Wave 1. Results of the analysis for Wave 1 reveal a significant difference between those individuals who changed racial identity and those who did not change racial identity $F(1, 45969) = 504.18, p = .000$ (see Table 49). Specifically, those individuals who did not change their reported identity between waves had reported using cocaine more often ($M = 3.61$) than those individuals whose reported identity between waves did change ($M = 2.13$).

Results of the analysis for Wave 3 reveal that there is a significant difference between those individuals who changed their reported race/racial identity between waves and those that did not $F(1, 104667) = 174.95, p = .000$ (see Table 49). Specifically, those individuals that changed their reported race/racial identity between waves and reported use of cocaine reported using cocaine a greater number of times ($M = 1.67$) than did those who did not change their reported race/racial identity between waves ($M = 1.00$).

Overall, results of cocaine use reveal a fairly consistent pattern. Specifically, the no changers were more likely to have reported use of cocaine and to have had a greater frequency of reported lifetime cocaine use at Wave 1 compared to the changers. Further, for Wave 3, the no changers were more likely to have reported use of cocaine and to have reported use of cocaine within the past year. However, the no changers reported using cocaine less frequently in the past 30 days than did the changers.

Other Illegal Drugs

Descriptive statistics for other illegal drug use by change for both Waves 1 and 3 are provided (see Table 50). Based on logistic regression results, there was a statistically significant odds ratio for change/no change and reported use of other illegal drugs at Wave 1, indicating a relationship with this variable (see Table 51). Specifically, those individuals whose race/racial identity did not change were more likely to have reported use of other illegal drugs than those whose race/racial identity did change.

Based on logistic regression results, there was a statistically significant odds ratio for change/no change and reported use of other illegal drugs at Wave 3, indicating a relationship with this variable (see Table 51). Specifically, those individuals whose race/racial identity did not change were more likely to have reported use of other illegal drugs than those whose race/racial identity did change. Based on logistic regression results, there was a statistically significant odds ratio for change/no change and reported use of other drugs within the past year at Wave 3 (see Table 51). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of other illegal drugs in the past year than those whose race/racial identity did change.

The use of other illegal drugs was measured at both Waves 1 and 3. Other illegal drugs were specified as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor's prescription. Wave 1 analysis of reported lifetime use of other illegal drugs revealed a significant difference between those individuals who changed their reported race/racial identity between waves and those that did not $F(1, 98256) = 2944.68, p = .000$ (see Table 52). Specifically, those individuals who changed their reported race/racial identity at Wave 1 reported having used other illegal drugs less

frequently ($M = 38.37$) than those individuals who did not change their reported race/racial identity ($M = 142.71$) (see Table 52). Frequency of other illegal drug use in the past 30 days was also measured at Wave 1. Individuals who reported no use of other illegal drugs within the past 30 days were removed from the analysis. Results of this analysis reveal that those individuals who changed their reported race/racial identity at Wave 1 reported having used other illegal drugs more frequently ($M = 10.76$) than those individuals who did not change their reported race/racial identity ($M = -3.49$) $F(1, 49250) = 3417.42, p = .000$ (see Table 52). Reported lifetime use of other illegal drugs was not measured at Wave 3.

Reported use of other illegal drugs in the past 30 days at Wave 3 reveal that there is a significant difference between those individuals who changed their reported race/racial identity and those who did not $F(1, 169011) = 9837.56, p = .000$ (see Table 52). Specifically, those individuals who did not change their reported race/racial identity between waves reported a higher frequency of use ($M = 6.92$) than did those who did change ($M = 2.50$).

Overall, reported use of other illegal drugs reveals a mixed pattern of results for changers and no changers. At wave 1, no changers were more likely to have reported use of other illegal drugs, had a higher reported frequency of lifetime use of other illegal drugs, but had a lower reported frequency of use of other illegal drugs in the past 30 days compared to the changers. At wave 3, the no changers were more likely to have reported use of other illegal drugs since June 1995, but were less likely to have reported use of other illegal drugs in the past year while using other illegal drugs at a greater reported frequency in the past 30 days at Wave 3 than the changers.

Inhalants/Crystal Meth

Descriptive statistics for inhalant/crystal meth use by change for both Waves 1 and 3 are provided (see Table 53). Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of inhalants at Wave 1 (see Table 54). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of inhalants than those whose race/racial identity did change.

Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of crystal meth since June 1995 (see Table 54). Specifically, those individuals whose race/racial identity did not change were more likely to have reported use of crystal meth than those individuals whose race/racial identity did change. Based on logistic regression results, there was a statistically significant odds ratio for change/no change and the reported use of crystal meth in the past year (see Table 54). Specifically, those individuals whose race/racial identity did not change were less likely to have reported use of crystal meth in the past year than those individuals whose race/racial identity did change.

Reported inhalant use was measured at Wave 1 and not at Wave 3. Reported use of crystal meth was measured at Wave 3 and not at Wave 1. Results for both are reported (see Table 55). An analysis of the reported lifetime use of inhalants reveals a significant difference between those who changed their reported race/racial identity between waves and those who did not $F(1, 64088) = 5237.80, p = .000$ (see Table 55). Specifically, those individuals who did not report a change in their race/racial identity between waves

reported a higher frequency of use of inhalants over their lifetime at Wave 1 ($M = 122.66$) compared to those who did change ($M = 15.70$).

The reported use of inhalants for those who had ever reported using inhalants, was measured for the past 30 days. Those individuals who reported that they had not used inhalants in the last 30 days were excluded from the analysis. Analysis of the reported use of inhalants in the past 30 days revealed a significant difference between groups $F(1, 15231) = 155.46, p = .000$ (see Table 55). Specifically, those individuals who had a change in their reported race/racial identity between waves reported using inhalants more frequently in the past 30 days ($M = 1.81$) than did those individuals who did not change ($M = 1.49$).

An analysis of the frequency of crystal meth use in the past 30 days at Wave 3 revealed similar findings as inhalant use in the past 30 days at Wave 1. As with the analysis at Wave 1 for past 30 day inhalant use, those individuals who did not report using crystal meth within the past 30 days were excluded from the analysis. There was a significant difference between those that had a change in their race/racial identity between waves and those that did not $F(1, 33554) = 251.19, p = .000$ (see Table 55). Specifically, those individuals who reported a change in their race/racial identity between waves reported using crystal meth more frequently in the past 30 days ($M = 3.08$) than did those individuals who did not change ($M = 2.11$).

Overall, results for use of inhalants reveal that the no changers were less likely to report having ever used inhalants but those that did report use of inhalants reported using them more frequently in their lifetime than did the changers. However, the no changers reported using inhalants less frequently than did the changers within the past 30 days at

Wave 1. Results for crystal meth use reveal that the no changers were more likely to have reported ever using crystal meth but were less likely to have reported using crystal meth in the past year compared to the changers. Further, the no changers were reported using crystal meth less frequently within the past 30 days than did the changers.

CHAPTER 5: DISCUSSION

The purpose of the study was threefold. The first was to determine if multiracial individuals were at a high risk for alcohol, tobacco, and drug use. The second purpose was to determine if there was a relationship between racial identity and risk behaviors. Lastly, the third purpose of the research was to determine how the changing of racial identity over time influences risk for engaging in risk behaviors.

The primary contention of this study was that minority racial identity is protective for multiracial individuals from engaging in risk behaviors and to examine what the relationship of change of racial identity over time and if it contributed to likelihood to engage in risk behaviors. The examination of change in racial identity over time was an empirical question as data have not previously been reported to examine this question. While several studies have, since the inception of the Add Health dataset, examined change/no change in multiracial identity over time (Doyle and Kao, 2007; Harris and Sim, 2002; Hitlin et al., 2006), none have looked at how this may be related to risk behaviors.

Research Question 1

The first research question was posed to provide the initial descriptive statistics regarding risk behavior of each multiracial group. The results are mixed, suggesting that there is no consistent pattern of use across the different measures of alcohol, tobacco, and other drug use. Results varied such that no single group consistently used alcohol, tobacco, or other drugs more or less than the referent group (those indicating their race as

White at either wave 1 or wave 3). This suggests that alcohol, tobacco, and other drug use varies by group and by drug, lending support to the need to examine racial identity (minority vs. White) rather than racial group as a predictor of risk behavior (Research Question 2).

Overall, it appears that at Waves 1 and 3 there were not consistent differences between the groups for tobacco use across the waves. However, within Wave 3, those multiracial individuals who identified their race as Black were consistently less likely to have ever smoked, smoked regularly, or have smoked in the past 30 days compared to multiracial individuals who identified their race as White at Wave 3. While there appear to be some differences existing between the multiracial groups on the use of alcohol, marijuana, and cocaine, it is not known whether these differences stem from the multiracial group itself or other factors such as racial identity.

A comparison of the results of the current study to past studies is not an equal comparison (e.g., Marsiglia et al., 2001; Caetano & McGrath, 2005). The methods by which multiracial individuals were identified and classified were different in the current study than in past studies. Further, the contention of this study is that multiracial status is not the basis on which these differences should be examined, but rather racial identity should be used when examining differences among multiracial groups in risk behaviors, which was examined in Research Question 2.

Research Question 1 results were contrary to the null hypothesis. These results are similar to those found in previous studies that examine risk behaviors with monoracial and multiracial individuals when multiracial individuals were not disaggregated (Beal et al. 2001; Udry et al. 2003; Whaley & Francis, 2006) and studies in which multiracial

individuals were disaggregated (Udry et al. 2003). For example, in Udry et al.'s (2003) analysis, they found significant positive odds ratios for smoking and drinking among Black/White individuals when compared to their Black referent group and for Asian/White individuals odds ratios for drinking and being drunk regularly were significantly greater compared to their Asian referent group. However, since the contention of the study was that a minority racial identity was protective, this discussion for Research Question 1 is limited.

Research Question 2

Hypothesis one was posed as non directional because it was expected that different multiracial groups would have different proportions of individuals identifying as minority. While differences have been found among certain samples of multiracial individuals, it was not known whether or not minority vs. majority identification would vary with national data. Research Question two posited a protective effect for minority identified individuals based on theoretical propositions and because previous research on monoracial individuals has indicated such a relationship exists (see Marsiglia et al. 2004; Caldwell et al. 2004; Pugh & Bry, 2007; Brook & Pahl, 2005).

Participants were not equally likely to identify with a minority group as with a majority group in either Wave. The proportion of each group who identified as minority ranged from 13% to 82% for Wave 1 and 8%-82% at Wave 3. These results are consistent with previous research findings, in small non random samples, on racial identification for those multiracial individuals who are part White. These findings are also similar to those found by Herman (2004) who examined high school students and

obtained the race of the student via race of the parent. In the Miville et al (2005) study, they found that of those multiracial participants who were part White, they tended to identify as non White as compared to White. Further, these results are also supported by Suzuki-Crumly & Hyers (2004) who examined the racial identification of Black/White and Asian/White individuals. However, these studies did not examine racial identity in terms of identification with a multiracial group; a possibility that may very well exist within these samples and data and can be explored in terms of Miville et al.'s (2005) work.

In Miville et al.'s (2005) qualitative study, they found that most of their multiracial participants identified with only one racial group but that most of the participants acknowledged identifying with multiracial persons in general, which the authors suggest is a private identity. The conceptualization of a public identity with a monoracial group and private identity with multiracial persons in general has been noted by other theorists in an attempt to avoid identity conflict (Nagayama Hall & Barongan, 2002). Thus, it may be, as time progresses and the multiracial movement becomes one that is more identifiable, that multiracial persons will begin to shift from identifying exclusively with one part of their racial background. Instead, they will identify with other multiracial persons as their racial group (Schiff & O'Neill, 2007). And it may be that for multiracial persons the notion of public versus private identity will reflect these patterns of identification. With public identities currently serving the function of identifying with one racial group and private identities serving the function of identifying with all multiracial persons, until the multiracial movement is more solidified and recognized as a legitimate group these private identities may remain as private identities

and thus may conflict with the protective benefits of their public identity. Thereby the protective benefits may be overridden in light of the conflict between public and private identity. So, while national data appears reflective of small sample data, both lack in having the option to identify with a multiracial group. Further studies should explore this area.

The differences between the racial groups and how they identified (minority versus White) may be due to factors such as physical appearance and other characteristics noted in the introduction. However, how the different racial groups identify may also have to do with the political context surrounding the 2000 Census where activists and political groups were trying to persuade multiracial individuals to identify a particular way on the census. These events may have impacted how the multiracial person thought of themselves and their identity and may have served as a critical event in raising their awareness to racial issues. Specifically in that a multiracial person may not have thought of race as an issue until these events took place. With Wave 3 of the data being collected between 2001-2002, this may be a legitimate explanation of the data whereby history impacted the results. So that multiracial individuals who previously were not thinking of race or their identity suddenly began to do so and were questioning their place in society, thereby potentially impacting the data in three ways: (1) Race choice (2) Racial identity choice (3) Risk behaviors.

Further, it may be that multiracial individuals are just now beginning to be able to see the option of identifying with other multiracial people as a result of these movements. Even Lewis (2006), a multiracial writer, notes that when he attended a multiracial conference that he walked in and saw others that looked like him and thought “These are

my people” (p. 230). And it was these kinds of events that led to a “sense of bonding” (p. 230) with other multiracial people. Bonding is a key concept in Cross’s racial identity model that also appears to be key in identity development for multiracial individuals (Schiff & O’Neill, 2007). This bonding would help to provide/promote self esteem in multiracial individuals which may in turn help protect them from engaging in risk behaviors.

Minority identified individuals were more likely than White identified individuals to use tobacco, alcohol, cocaine, and other drugs in the analyses that examined use or no use, but less often and in lesser amounts in other analyses. Patterns for when minority-identified individuals tended to be consistently less likely to use can be supported by the results when examined within each of three categories of use: 1) tobacco and alcohol; 2) marijuana and cocaine; and 3) all other drugs. These groupings range from most to least commonly used substances as well as from those that may be considered least to most harmful.

Results for measures of alcohol and tobacco use that assess ‘ever’ use consistently show minority-identified individuals to be more likely than non-minority individuals to report having used. Results for measures of alcohol and tobacco use that assess heaviness of use consistently show minority-identified individuals reporting using less than non-minority identified individuals (e.g., daily use in past 30 days, number of drinks consumed when drinking). A possible explanation for these results is that while minority identification is not protective against trying tobacco and/or alcohol, it is associated with lighter reported use of these drugs. A further explanation could be that their private and public identities are in conflict with each other, putting them at risk for use. These data

are similar to those data for monoracial groups for reported alcohol and tobacco use (see Kandel, Kiros, Schaffran, & Hu, 2004; Shavers, Lawrence, Fagan, & Gibson, 2005; White, Nagin, Replogle, & Stouthamer-Loeber, 2003).

Data for those monoracial occasional smokers indicate that occasional smoking is reported to be highest among Hispanics, second highest among Asians, followed by African Americans, American Indians, and Non Hispanic White's (Shavers et al., 2005). Among reported heavy smokers, the prevalence was highest for Non Hispanic Whites, followed by American Indians, African Americans, Asians, and Hispanics (Shavers et al., 2005). In a study by White et al. (2003) they examined racial differences between Whites and African Americans in the onset and levels and patterns of cigarette use. Their findings showed that Whites tended to report being regular and heavy smokers compared to African Americans and that these differences were stable from adolescence through young adulthood. In an analysis by Kandel et al. (2004) using Waves 1 and 2 of Add Health, they found that reported smoking initiation was higher among Hispanics (20.3%) and Whites (18.2%) than among Black adolescents (16.2%). When examining regular smoking they found that White adolescents were most likely to report smoking daily (18.8%) compared to Black adolescents (9.6%). Asian youth were not included in this study.

The ever use/heaviness of use distinction holds up less well when examining patterns of use of marijuana and cocaine vis-a-vis minority-identification. The pattern appears to be the reverse of that for tobacco and alcohol, but is less clear. No clear pattern can be discerned from these results in regard to minority identity being protective of risk behaviors. It appears that use of these 'harder' drugs is not related to whether an

individual identifies with his or her minority heritage. These results are inconsistent with results found in tobacco and alcohol use where minority identified individuals were more likely (categorically) to have used a substance but were using the substance less frequently.

Researchers have noted that there has been a considerable amount of concern about the impact of the multiracial individual and the struggles in sometimes feeling pushed to identify with the minority group, which is typically the group that is disenfranchised, which may potentially lead to negative outcomes (Nagayama Hall & Barongan, 2002). The process of forming an identity during adolescence may be more complicated for the racial/ethnic minority individual as it requires identification that is different from those who are close to them (parents, friends) and identification with a group that is not recognized or valued in society (Nagayama Hall & Barongan, 2002). Further complicating the identity process for the multiracial individual is that they typically encounter experiences where their ambiguous features are questioned and they are sometimes pressured to identify with a particular group or they are rejected by the groups that represent their racial/ethnic background (Nagayama Hall & Barongan, 2002).

Thus, multiracial individuals who are minority group identified may still be more at risk as adolescents as their identity formation is still being developed and may be a more critical identity development process than compared to other adolescents. Further it is the contention of several researchers that for biracial or multiracial persons, it is most beneficial psychologically for the biracial or multiracial person to identify as biracial or multiracial, as opposed to monoracial (Coleman & Carter, 2007). Identifying as biracial or multiracial has been found, in qualitative data, to be related to feelings of belonging,

having shared experiences, and having “common struggles” (Ahnallen et al., 2006).

With identification as biracial or monoracial being the last stage of Poston (1991) and Root’s (1990) development models it seems that this would be the most optimal identity for the biracial/multiracial person-identification. While multiracial individuals may hold a private identity as multiracial, until this becomes a public identity, they may not yet reap the full benefits of racial/ethnic group pride and its buffering from negative events.

In a study of young adults by Coleman & Carter (2007) they found that those Black/White biracial young adults who identified as biracial had significantly lower anxiety and depression than did those who identified as biracial but report that they experience the world as a Black person. In essence, having a public identity as a biracial person was more beneficial for this group than having a private biracial identity and a presumably public Black identity. Of further interest is that the individuals in this sample reported experiencing the highest amount of pressure from society, not from friends or family, to identify as monoracial. In light of the movements around the 2000 Census for multiracial persons to identify as monoracial, this pressure was particularly focused on those individuals with Black ancestry. Thus, it is of no surprise that the individuals within this sample felt the most pressure from society to identify as monoracial (Lewis, 2006; Rockquemore & Brunsma, 2002).

Overall it appears that at Wave 3, minority identification seems to generally be protective for use of marijuana, cocaine, other illegal drugs, and crystal meth. However, Wave 1 results that reflect minority identified individuals being more likely to engage in risk behaviors could be a reflection of them beginning to encounter pressure to identify with groups and encountering “What are you?” situations at adolescence that lead them to

feeling isolated and marginalized, hence the engagement in the risk behaviors at Wave 1. This may also be a reflection of the sample being younger at Wave 1 and thus maturation taking place between the Waves.

The data for minority identified individuals' behavior may be a reflection of the racial group norms for those monoracial groups with which the multiracial person identifies. However, it may be that for some multiracial persons identity may not just be about identifying exclusively with one, both, neither, or with multiracial people in general. It may be about identifying oneself, for example, as "Japanese American and White American and multiracial" which is something that isn't captured in surveys, something that is conceptually difficult for many who tend to think of race as an all or none type of categorization. But it is not uncommon for people to see themselves in many ways, such as a mother, a daughter, a student, a friend, an employee, a church goer, and as a Black woman.

While there are factors that may contribute to putting a multiracial individual at greater risk for substance use than their monoracial counterparts, little is known about what factors contribute to buffering some of the negative experiences of multiracial individuals. While it was originally thought that multiracial persons developed their identity via their interactions with their respective monoracial groups, it may be that multiracial individuals simultaneously have more than one identity which is formed irrespective of experiences with other groups (Ahnallen et al., 2006). Ahnallen et al. (2006) propose that multiracial individuals may differ from monoracial individuals in that their identity develops independent of social factors and groups. Further, the identity of the multiracial individual may not be related to traditionally thought of factors such as

physical appearance. Thus, Anhallen et al. (2006) are suggesting that identity for the multiracial individual may not be socially constructed, as it is with monoracial individuals. However, other theorists suggest that multiracial identity is heavily related to social relationships and physical appearance and that the bonding with others of mixed race and relating to their similar life experiences helps to support a positive racial identity (Schiff & O'Neill, 2007). It is this bonding that is at the core of Black identity (Cross & Strauss, 1998). Where the "...bonding function addresses the degree to which the person derives meaning and support, in life, from an affiliation or "attachment to Black people and the Black experience (p. 271)" (Cross & Strauss, 1998). As one participant notes in the Schiff & O'Neill (2007) interviews,

...going to the mixed-race students group [Fusion]...and then talking out a lot of the stuff with them. And what it means to be mixed race...All that helped, too, to bring that out, like self-identifying as a certain culture or group or wanting to be a part of a certain thing. All that became more clear and made more sense, I think, in terms of being something I wanted and something that was part of me. And I realized that. And so it was OK to be a part of that (p.151-152)

This participant further described that bonding with these group members provided her with the resources needed for building her identity because others in the group shared similar experiences in defining their identity and in negative racist encounters (Schiff & O'Neill, 2007). While having a multiracial group to identify with may provide a buffer similar to monoracial models, there may be additional factors that can help to buffer the negative experiences multiracial individuals may face. Identification of these types of factors that contribute to enhanced buffering and bonding could prove to be important in

developing interventions for multiracial individuals who may be at risk for engaging in problem behaviors. Further analyses may examine if a certain racial identity is more protective for some multiracial groups than for others.

Research Question 3

The examination of change in racial identity over time was an empirical question. While several studies have, since the inception of the Add Health dataset, examined change in multiracial identity over time (Doyle & Kao, 2007; Harris & Sim, 2002; Hitlin et al., 2006), none have looked at how this may be related to risk behaviors.

Overall, those who did not change racial identity had fewer positive associations with tobacco related behaviors than those who changed. Those individuals who did not have changes in their reported race/racial identity were better off when it comes to smoking. However, that is not to say that the no changers did not have changes in identity between the Waves, but there was no change with the two timepoints that were measured. A consistent pattern for alcohol use was not found. No relationship between change of identity and alcohol use was found. We found a consistent pattern for marijuana use. The no change category had consistently fewer positive associations with marijuana use behavior.

On the other hand, the no change category had more positive than negative associations with cocaine use behavior. The no changers were more likely to have used cocaine and to have had a greater frequency of lifetime cocaine use at Wave 1 compared to the changers. Further, for Wave 3, the no changers were more likely to have used cocaine and to have used cocaine within the past year than the changers. Finally there

was no consistent pattern of association between the no change category and use of other illicit drugs that emerged from the data analyses.

While there appear to be patterns of association between the change variable and using some substances, an examination of the likelihood of using each type of substance may clarify the results. Results of the categorical data analyses for each of the variables was created to allow for ease of interpretation (see Table 56). It appears that the changers are more likely to smoke, drink, and use marijuana while the no changers are more likely to use cocaine and possibly other illegal drugs. However, results for inhalant and crystal meth use are mixed.

Changing Nature of Racial Identity

“Biracial persons maneuver through social systems of categorization that for others are matter of fact” (Schiff & O’Neill, 2007, p. 145). Root (1990) noted that multiracial individuals “may move fluidly between racial groups but view themselves apart from these reference groups without feeling marginal because they have generated a new reference group” (p. 201). Identity changes can occur over time which may be separate and distinct from the chameleon effect (adapting to one’s circumstances). While a changing/situational identity may be common in multiracial persons, it may be that the changing nature of one’s identity is so common that it could not be captured in this study by measurement at two distinct time points so far apart (Miville et al. 2005; Schiff & O’Neill, 2007). However, if multiracial individuals commonly have a monoracial identity (that is minority) publicly so as to serve as a buffer to racism, then that public identity should be fairly stable over time and not necessarily shift depending upon the circumstances and rather coincide with developmental stages such as adolescence and

adulthood which was illustrated in an interview with a biracial woman who reflected upon how she identified over the years (Lewis, 2006). However, again, if their private identity is different, then they may not benefit as well.

While it is known that even in monoracial groups that racial identity may change over time (from being less to more identified; see Hyers, 2001), it is presumed that their public and private identities coincide with each other, an assumption that cannot be made of multiracial individuals. So, if the multiracial individual's private identity is in conflict with their public identity, that may still lead to feelings of being marginalized and isolated as opposed to one's public and private identities coinciding with each other; thereby leading to not reaping the full benefits of the buffering mechanism. Further, it may be that the private identity, once turning in to the public identity, may provide additional buffering mechanisms that are unique to the multiracial person.

As an illustration of the potential conflict between public and private identity, in Miville et al.'s (2005) study, participants reported that when engaging in the type of situational negotiation between groups, they felt as if they never completely fit in to a group. According to Phinney (2006), perceptions from society are equally as important as the response the multiracial person has to society and that development of ethnic identity requires one to understand societal perceptions but not be defined by them. So, this is in conflict with the public versus private identity. According to Phinney's (2006) position, a private identity that does not coincide with a public identity is not optimal. And it cannot be determined from the data whether or not participants were reporting what they perceived as their public or private identity. Therefore, the conclusions that can be drawn from the data are limited.

One of the interviewees in Schiff & O'Neill's (2007) study reported "so it's OK to kind of waver back and forth and then, but then, I guess, not even feel guilty about it." (p. 148) When further probed about this response the interviewee commented that upon reflection of this wavering behavior, prior to the acknowledgement of being a mixed race person, that she felt guilty about it and that much of her behavior she was still trying to sort/figure out (Schiff & O'Neill, 2007). This interviewee also felt guilty for what she felt was denying a part of who she was in the past, now having guilt for previous identity "choices." According to Schiff & O'Neill (2007)

...only from the perspective of a changed, or changing, identity could Rachel feel guilt for avoiding the public acknowledgement of her Hispanic background. The contrast between these two periods from the vantage point of becoming mixed race appears to have driven her discomfort and guilt. (p. 149)

And now Rachel feels that it is crucial for her to incorporate these parts of her to feel like a whole person. Further, Suzuki-Crumly & Hyers (2004) found that their biracial participants experienced a great deal of anxiety when interacting with certain groups representing their respective backgrounds, which was dependent upon what their racial identity was. Asian/White individuals who didn't identify with any of their ethnic backgrounds (not minority identified, not majority identified, not biculturally identified), experienced the most anxiety when interacting with their particular Asian group, with Whites, and with others in general. Similar patterns were seen for those individuals of Black/White backgrounds, however, minority identified individuals reported experiencing the least amount of anxiety when interacting with Blacks, Whites, or individuals from other ethnic groups (Suzuki-Crumly & Hyers, 2004).

To conduct a post hoc analysis of racial identity stability over time in the present study, frequency counts were examined to determine what types (minority v White identified) of individuals were changers or no changers, because maybe it is within these groups that differences exist beyond demographics. Among the overall sample used in the analysis of the change variable, 42.7% were minority identified at both time points and 35% were majority identified at both time points; 13% were minority identified at Wave 1 and White identified at Wave 3 while 9.3% were White identified at Wave 1 and minority identified at Wave 3. So it appears that the no changers group consists of two subgroups, groups that would theoretically be different from one another: those who remain minority identified and those who remain White identified. It may be the difference in these two groups that leads to the mixed results, however, analyses at this level are beyond the scope of the paper.

Limitations

The study has a number of limitations that should be acknowledged. While there are frequently limitations present within studies with multiracial individuals, this study was able to avoid a few of those. Among the common limitations in studies with multiracial individuals is the method in which the sample is obtained. Most often with research on multiracial individuals, the snowball technique is used to obtain a sufficient sample size, which does not necessarily lead to a representative sample. Another limitation often found in studies with multiracial individuals is the aggregation of all multiracial individuals. This particular limitation is seen with many of the studies that were reviewed. While these two issues are typical of research on multiracial individuals,

the Add Health data were collected using a random, nationwide sample of individuals. Further, the data were collected in a way that allows the analyses of the different multiracial groups separately, instead of having to aggregate them. And lastly, the data are longitudinal in nature which allows for testing of research questions that would not be possible with cross-sectional data.

A potential difficulty and limitation of the current study is the limited categories available for racial identity on the survey. Specifically, there is not a category for individuals to select as identifying as multiracial, biracial, or with more than one group. Further, participants did not have the option to select more than one racial group with which they identify. The question posed to participants is to identify one race which best describes their background. It may be that some participants did not feel like there was only one with which they identified. In such a case the response may not be valid or reliable. Also, it is not clear if this is a public or private identity participants are reporting which may impact the results in that buffering and bonding should take place if both their public and private identity are in congruence with each other.

Another limitation of the proposed study is that an actual measure, as opposed to self-report, of racial identity was not used in Add Health. Utilization of a racial identity measure would be more powerful than self report of an identity as it would give the potential to measure degree of identity with the particular group. Specifically, individuals are asked which group they identify with as opposed to having a racial identity scale that measures their degree of racial identity. However, Marsiglia et al. (2001) utilized a self identification checklist for creating their ethnic group categories and note that their study supports the idea that "...ethnic labels should not be disregarded

when researching self-reported drug use among adolescents or youth of diverse ethnic backgrounds.” (p. 41). Other researchers have also utilized self report as opposed to a scale and have found it to be predictive of different behaviors and psychological processes (Suzuki-Crumly & Hyers, 2004). However, there are not any widely accepted or validated measures by which to measure racial identity for multiracial individuals.

A third limitation of the proposed study is the way in which race was measured. Specifically, self report of the individual was used to determine a participant’s race. Additional levels of data accuracy for the measurement of race could have been put in place. For example, questions asking for the race of each of the parents could have been asked. This would allow for an increased clarification of who is multiracial. Self report of race has been found to be problematic for multiracial individuals in that multiracial individuals do not necessarily identify themselves as multiracial, even when given the choice (Hitlin et al., 2006; Tashiro, 2001). They may identify themselves as monoracial and thus be classified as not being multiracial. So, there may have been more multiracial individuals within the dataset but were not identified because they may have selected a monoracial race at both time points. Therefore this impacts that generalizability of this data as it may not be representative of the multiracial population within the United States. Thus, assessment of parental race may be a more stable measure of race than self report for the multiracial individual.

A fourth limitation of the given study is also related to how race was measured. Race was measured in the Add Health study using an in-home survey. Other investigators have found that multiracial individuals may change their reported race, dependent upon the context, be it at home with a parent present or at school where the

answers are anonymous (Schmitt, 2001; Harris & Sim, 2002). Again, if race was determined by the student's self report of the race of their parents, more accurate data may be garnered thereby making the data more representative.

A fifth limitation of the data is that the variable that is used as the proxy for racial identity was not measured during Wave II of the data collection. The racial identity proxy variable was only measured during Waves I and III. Since the data were measured in this way, we could not test whether a certain number of changes over time is related to risk behaviors. The analysis is limited to whether or not there was a change in racial identity and if that is related to risk behaviors.

Another further limitation of this study is the use of weighted data. While the data should be weighted for analysis, it may have lead to many results that were statistically significant but not necessarily practically significant. Also, the threat of attrition is present in the current study. Characteristics about those groups that dropped out from the study from Wave 1 to Wave 3 are not known. It may be that those individuals that remained in the study are somehow different than those who did not. And lastly, self-report of alcohol, tobacco, marijuana, cocaine, inhalants, crystal meth, and other illegal drugs were measured via self report, which may not accurately reflect the actual use of these substances. Further, changes in use may be due to maturation between Waves.

Future Research

Because the process of forming a racial/ethnic identity for the multiracial person is more complex than for the monoracial person, more studies are needed to examine multiracial individuals at an earlier age and follow them until an older age (beyond young adulthood) (Phinney, 2006). Since another Wave of data is being collected by Add Health during 2007-2008 it may be that future research can continue to examine how identity changes over time and if the proposed hypotheses hold true, assuming that the same variables are available in the Wave 4 data. If the data is there, it can be analyzed to see if multiracial individuals develop a more solid sense of identity further into adulthood as suggested by some theorists (Phinney, 2007; Schiff & O'Neill, 2007). Further, it would be ideal to conduct in depth interviews with those multiracial participants that were focused on their racial identity.

Implications for Future Research

Qualitative studies should be conducted to examine situational identity and whether it is differentiated from what Rockquemore & Brunnsma (2008) refer to as the protean identity. Specifically, diary studies could help to clarify this issue and help understand how much this is engaged in etc. and how it is/is not related to racial/ethnic identity. This would help to clarify the issue of how the multiracial person's identity functions.

Since most multiracial persons do not have an existing multiracial group with which to identify, they are currently left to delve into a complicated racial/ethnic identity process that may involve the rejection or negotiation of one or both of their parents. It may be that multiracial persons who have an existing multiracial group with which to

identify do not experience their racial/ethnic identity development in the same manner as those multiracial individuals who do not have an existing multiracial group with which to identify-yet this would presumably be a small percentage of the population. Further, the issue of public and private identity should be teased out in future data.

Patterns in racial identity for multiracial persons may be reflective of more than just those variables that have been sometimes found to be related to identification with a racial group for multiracial persons (e.g., closeness to parent, physical features, etc.). An important aspect of racial identity is the sense of belonging to the group (Ahnallen et al., 2006). It may be that for multiracial persons, this sense of belonging to the group is particularly important in their racial identity and may in fact contribute to the sometimes changing nature of their racial identity. Future research should examine if in fact a sense of belonging does impact one's racial identity.

Current Public Health Practice Implications

By being able to identify those multiracial individuals who are most at risk, intervention programs to help eliminate and reduce this risk can be created. And those intervention programs can be targeted at those individuals who are most at risk instead of wasting resources by targeting all multiracial persons in general. Since there is currently no clear consensus of who is most at risk within the multiracial population, programs should be in development now to reach out to all multiracial persons until the research is clear as to who is most at risk. The creation of programs to intervene will help to add more individuals to society who are at reduced risk for cancer, alcoholism, and a variety

of behavioral issues which impact those multiracial individuals who are at risk and those multiracial individuals' families and friends.

Implications of Current Findings

Given the growing population of multiracial individuals and the current large numbers of multiracial children, programs should be created for these children. Specifically, programs that bring together multiracial children so that they can (1) see/know that there is a multiracial reference group in society (2) so they can begin to bond with other multiracial individuals (3) so that the bonding that they have can eventually provide them with the ability to buffer negative experiences they may encounter. By creating a multiracial reference group that may instill buffering skills this may prevent multiracial individuals from being at a higher risk for a variety of behaviors, but specifically with regard to use of alcohol, tobacco, and other drugs.

Conclusion

While the results of the current study did not fully answer the questions that were posed, it did shed light on the area. Specifically, work with multiracial individuals clearly should disaggregate the multiracial groups since there are differences among the groups within the general multiracial population. Second, it is clear that issues of the stability of identity and its protective functions are important areas for future studies because this is a complex topic that needs more attention. Lastly, the current study, based on reviewed literature and results of the data, highlights the need for programs for multiracial individuals so that bonding can occur and buffering skills can begin to

develop more quickly. The multiracial population will continue to grow and with this growth should be the growth of research to help shed light on this emerging population.

References

- Ahnallen, J., Suyemoto, K., & Carter, A. (2006). Relationship between physical appearance, sense of belonging and exclusion, and racial/ethnic self-identification among multiracial Japanese European Americans. *Cultural Diversity and Ethnic Minority Psychology, 12* (4), 673-686.
- Anzaldúa, G. (2007). *Borderlands/La Frontera: The new mestiza*. San Francisco, CA: Aunt Lute Books.
- Beal, A. C., Ausiello, J., & Perrin, J. (2001). Social influences on health-risk behaviors among minority middle school students. *Journal of Adolescent Health, 28*, 474-480.
- Brady, S. & Donenberg, G. (2006). Mechanisms linking violence exposure to health risk behavior in adolescence: Motivation to cope and sensation seeking. *Journal of the American Academy of Child and Adolescent Psychiatry, 45* (6), 673-680.
- Brook, J. & Pahl, K. (2005). The protective role of ethnic and racial identity and aspects of an Africentric orientation against drug use among African American young adults. *The Journal of Genetic Psychology, 166* (3), 329-345.
- Brunsma, D. (2006). Public categories, private identities: Exploring regional differences in the biracial experience. *Social Science Research, 35*, 555-576.
- Caetano, R. & McGrath, C. (2005). Driving under the influence (DUI) among U.S. ethnic groups. *Accident Analysis and Prevention, 37*, 217-224.
- Caldwell, C., Sellers, R., Bernat, D., & Zimmerman, M. (2004). Racial identity, parental support, and alcohol use in a sample of academically at-risk African American high school students. *American Journal of Community Psychology, 34* (1/2), 71-

82.

- Chiyoko King, R. & DaCosta, K. M. (1996). Changing face, changing race: The remaking of race in the Japanese American and African American communities. In M. Root (Ed.), *The multiracial experience: Racial borders as the new frontier* (pp.227-244). Thousand Oaks, CA: Sage Publications.
- Choi, Y., Harachi, T., Rogers Gilmore, M., & Catalano, R. (2006). Are multiracial adolescents at greater risk? Comparisons of rates, patterns, and correlates of substance use and violence between monoracial and multiracial adolescents. *American Journal of Orthopsychiatry*, 76 (1), 86-97.
- Coleman, V. & Carter, M. M. (2007). Biracial self-identification: Impact on trait anxiety, social anxiety, and depression. *Identity: An International Journal of Theory and Research*, 7 (2), 103-114.
- Colker, R. (1996). *Hybrid: Bisexuals, multiracials, and other misfits under American law*. New York, NY: New York University Press.
- Corral, J. (1998). Lucy, I'm home. In O. Edut (Ed.), *Adios, Barbie: Young women write about body image and identity* (pp. 114-123) Seattle: WA, Seal Press.
- Cross, W. (1991). *Shades of black: Diversity in African-American identity*. Philadelphia: Temple University Press.
- Cross, W. & Strauss, L. (1998). The everyday functions of African American identity. In J.K. Swim & C. Stangor (Eds.), *Prejudice: The target's perspective* (pp.268-280). San Diego, CA: Academic Press.
- DeLucia, C. & Pitts, S. (2005). Applications of individual growth curve modeling for pediatric psychology research. *Journal of Pediatric Psychology*, 31 (10), 1002-

1023.

- Edwards, L. & Pedrotti, J. (2008). A content and methodological review of articles concerning multiracial issues in six major counseling journals. *Journal of Counseling Psychology, 55* (3), 411-418.
- Fuji Collins, J. (2000). Biracial Japanese American identity: An evolving process. *Cultural Diversity and Ethnic Minority Psychology, 6* (2), 115-133.
- Garcia, M. & Lega, L. (1979). Development of a Cuban ethnic identity questionnaire. *Hispanic Journal of Behavioral Sciences, 1*, 247-261.
- Harris, K., Florey, F., Tabor, J., Bearman, P., Jones, J., & Udry, R. (2003). The National Longitudinal Study of Adolescent Health: Research Design [www document]. URL: <http://www.cpc.unc.edu/projects/addhealth/design>.
- Harris, D.R. & Sim, J. J. (2002). Who is multiracial? Assessing the complexity of lived race. *American Sociological Review, 67*, (4), 614-627.
- Helms, J. (1990). *Black and white racial identity: Theory, research, and practice*. Westport, CT: Greenwood Publishing Group.
- Herman, M. (2004). Forced to choose: Some determinants of racial identification in multiracial adolescents. *Child Development, 75* (3), 730-748.
- Hitlin, S., Brown, J., & Elder, G. (2006). The social process of racial identity development across adolescence: Monoracial vs. multiracial pathways, *Child Development, 77*, 1298-1308.
- Hyers, L. L. (2001). A secondary survey analysis study of African American ethnic identity orientations in two national samples, *Journal of Black Psychology, 27* (2), 139-171.

- Johnson, D. (1992). Developmental pathways: Toward an ecological theoretical formulation of race identity in Black-White biracial children. In M. Root (Ed.), *Racially mixed people in America* (pp. 37-49). Newbury Park, CA: Sage.
- Johnson, K. (1999). *How did you get to be Mexican? A White/Brown man's search for identity*. Philadelphia: Temple University Press.
- Kandel, D., Kiros, Gebre-Egziabher, Schaffran, C., & Hu, Mei-Chen (2004). Racial/Ethnic-Differences in cigarette smoking initiation and progression to daily smoking: A multilevel analysis. *American Journal of Public Health, 94* (1), 128-135.
- King, R. C. (2001). Mirror, mirror, on the wall: Mapping discussions of feminism, race, and beauty in Japanese American beauty pageants. In T. Williams-Leon & C. Nakashima (Eds.), *The sum of our parts: Mixed heritage Asian Americans* (pp. 163-171). Philadelphia: Temple University Press.
- LaVeist, T. (1994). Beyond dummy variables and sample selection: What health services researchers ought to know about race as a variable. *Health Services Research, 29*, (1) 1-16.
- Lewis, Elliott (2006). *Fade: My journeys in multiracial America*. New York: Carroll and Graf Publishers.
- Marsiglia, F., Kulis, S., & Hecht, M. (2001). Ethnic labels and ethnic identity as predictors of drug use among middle school students in the southwest. *Journal of Research on Adolescence, 11* (1), 21-48.
- Marsiglia, F., Kullis, S., Hecht, M., & Sills, S. (2004). Ethnic self-identification and

ethnic identity as predictors of drug norms and drug use among pre-adolescents in the Southwest. *Substance Use and Misuse*, 39 (7), 1061-1094.

Miville, M., Constantine, M., Baysden, M., & So-Lloyd, G. (2005). Chameleon changes: An exploration of racial identity themes of multiracial people. *Journal of Counseling Psychology*, 52 (4), 507-516.

Nagayama Hall, G. & Barongan, C. (2002). *Multicultural Psychology*. Upper Saddle River, NJ: Prentice Hall.

Office of Minority Health (2007). Eliminating racial and ethnic health disparities. Retrieved February 18, 2007, from <http://www.cdc.gov/omh/AboutUs/disparities.htm>

National Center for Health Statistics (2006). *Health, United States, 2006*. Retrieved April 30, 2007 from [http://www.cdc.gov/nchs/data/06.pdf#066](http://www.cdc.gov/nchs/data/hus/06.pdf#066)

Phinney, J. (1992). The Multigroup Ethnic Identity Measure: A new scale for use with adolescents and young adults from diverse groups. *Journal of Adolescent Research*, 7, 156-176.

Phinney, J. (2006). Ethnic identity exploration in emerging adulthood. In J. Jensen Arnett & J. Lynn Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp.117-134). Washington, DC: American Psychological Association.

Poston, C. (1990). The biracial identity development model: A needed addition. *Journal of Counseling & Development*, 69, 152-155.

Pugh, L. & Bry, B. (2007). The protective effects of ethnic identity for alcohol and marijuana use among Black young adults. *Cultural Diversity and Ethnic Minority*

Psychology, 13 (2), 187-193.

Rockquemore, K. & Brunson, D. (2002). *Beyond Black: Biracial identity in America*.

Thousand Oaks, CA: Sage.

Root, M. (1992). *Racially mixed people in America*. Newbury Park, CA: Sage

Publications.

Root, M. (1996). *The multiracial experience: Racial borders as the new frontier*.

Thousand Oaks, CA: Sage Publications.

SAMHSA (2004). *2004 National survey on drug use and health: Detailed tables*.

Retrieved February 15, 2007, from

[http://www.drugabusestatistics.samhsa.gov/NSDUH/2k4nsduh/2k4tabs/Sect1peT
abs1to66.htm#tab1.28b](http://www.drugabusestatistics.samhsa.gov/NSDUH/2k4nsduh/2k4tabs/Sect1peTabs1to66.htm#tab1.28b)

Schiff, B. & O'Neill, T. The relational employment of mixed racial identity. In

Josselson, R., Lieblich, A., and McAdams, D. (Eds.), *The meaning of others: narrative studies of relationships* (pp. 143-163). Washington, DC: American Psychological Association.

Schmitt, E. (2001). Blacks split on disclosing multiracial roots. Retrieved 2001, from

[http://www.nytimes.com/2001/03/31/national/31RACE.html?ex=1196830800&en
=9629fdb67752ba3e&ei=5070](http://www.nytimes.com/2001/03/31/national/31RACE.html?ex=1196830800&en=9629fdb67752ba3e&ei=5070)

Shavers, V., Lawrence, D., Fagan, P., & Gibson, J. (2005). Racial/ethnic variation in cigarette smoking among the civilian US population by occupation and industry,

TUS-CPS 198-1999. *Preventive Medicine*, 41, 597-606.

Shih, M. & Sanchez, D. (2005). Perspectives and research on the positive and negative

implications of having multiple racial identities. *Psychological Bulletin*, 131 (4), 569-591.

State of Washington: Office of Financial Management (2006). Projections of the state population by age, gender, and race/ethnicity: 2000-2030. Retrieved February 23, 2007, from http://www.ofm.wa.gov/pop/race/methodology_0306.pdf

Suzuki-Crumly, J. & Hyers, L. (2004). The relationship among ethnic identification, psychological well-being, and intergroup competence: An investigation of two biracial groups. *Cultural Diversity and Ethnic Minority Psychology* 10 (2), 137-150.

Sue, D. W. (1981). *Counseling the culturally different: Theory and practice*. New York: Wiley.

Tashiro, C. (2001). Mixed but not matched: Multiracial people and the organization of health knowledge. In T. Williams-Leon & C. Nakashima (Eds.), *The sum of our parts: Mixed heritage Asian Americans* (pp.173-182). Philadelphia: Temple University Press.

Udry, J. R., Li, R. M., & Hendrickson-Smith, J. (2003). Health and behavior risks of adolescents with mixed-race identity. *American Journal of Public Health*, 93, (11), 1865-1870.

Whaley, A. & Francis, K. (2006). Behavioral health in multiracial adolescents: The role of Hispanic/Latino ethnicity. *Public Health Reports*, 121, 169-174.

White, H., Nagin, D., Replogle, E., & Stouthamer-Loeber, M. (2004). Racial differences in trajectories of cigarette use. *Drug and Alcohol Dependence*, 76, 219-227.

Williams, T. K. (1996). Race as a process: Reassessing the “what are you?” encounters of biracial individuals. In M. Root (Ed.), *The multiracial experience: Racial borders as the new frontier* (pp. 191-210). Thousand Oaks, CA: Sage.

Williams-Leon, T. & Nakashima, C. (2001). *The sum of our parts: Mixed heritage Asian Americans*. Philadelphia: Temple University Press.

U.S. Bureau of the Census (2000). Accessed 11/25/07 at

http://factfinder.census.gov/servlet/QTable?_bm=y&-geo_id=01000US&-qr_name=DEC_2000_SF1_U_DP1&-ds_name=DEC_2000_SF1_U

U.S. Bureau of the Census (2004) accessed 11/25/07 at

<http://www.census.gov/ipc/www/usinterimproj/natprojtab01b.pdf>

Table 1: Respondents Selecting More Than One Race at Both Waves and Their Selected Racial Identity at Each Wave

Racial identity chosen	Wave 1*	Wave 3*
White	36.6%	37.5%
Black	25.0%	28.7%
American Indian/Native American	8.8%	8.8%
Asian or Pacific Islander	18.1%	17.6%
Other	3.7%	n/a
Refused	1.9%	2.3%
Don't know	5.6%	1.4%
Not applicable	.5%	3.7%
Legitimate skip	0%	0%
Total multiracial	216	216

*excludes those individuals who selected Hispanic and only one other race at that Wave

Table 2: Changing Race Between Waves 1 and 3*

	N
Monoracial at Wave 1 Multiracial at Wave 3	349
Multiracial at Wave 1 Monoracial at Wave 3	376
Multiracial at both time points	216
Total	942

*excludes those individuals who selected Hispanic and only one other race at either Wave 1 or 3

Table 3: Most Frequently Chosen Race Categories for Those Who Changed From Wave 1 to 3*

	N
Multiracial to monoracial	
White identified-Monoracial	172
Black identified-Monoracial	124
American Indian/Native American identified-Monoracial	32
Asian identified-Monoracial	32
Other identity-Monoracial	11
Monoracial to multiracial	
Monoracial-White identified	205
Monoracial-Black identified	86
Monoracial-American Indian/Native American identified	20
Monoracial-Asian identified	30

*excludes those individuals who selected Hispanic and only one other race

Table 4: Descriptive Statistics for the 5 Largest Racial Groups at Waves 1 and 3

	Hispanic/ Asian/ White	American Indian/ White	White	Black/ White	Asian/ White	Black
Wave 1						
Minority Identified	50.2%	13.4%	n/a	82.0%	50.9%	n/a
N	100,585	43,187		81,270	45,137	
% Female	55.5%	44.4%	48.5%	45.9%	60.2%	n/a
N	115,166	142,602	138,723	49,424	53,647	
Age	15.67	15.89	15.53	15.82	15.75	n/a
SD	1.73	1.86	2.41	2.27	1.81	
N	207,673	321,212	286,024	107,636	89,070	
Wave 3						
Minority Identified	n/a	8.4%	n/a	82.3%	39.0%	n/a
N		38684		58,872	46,516	
% Female	n/a	47.5%	47.6%	45.6%	48.7%	47.8%
N		222,123	143,988	37,647	61,121	52430
Age	n/a	21.61	21.53	22.16	21.32	21.80
SD		1.82	1.69	1.81	1.80	1.91
N		467,810	302,715	82,515	125,412	109683
Education	n/a	12.68	12.80	13.98	13.11	13.12
SD		2.06	1.86	2.16	1.90	1.82
N		467,810	302,715	82,515	125,412	109683

Table 5: Race and Proportion of Tobacco Use

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	White	Black	Black/ White
Wave 1						
% Ever smoked a cigarette	69.4%	64.5%	60.2%	66.0%	n/a	57.8%
<i>N</i>	144,060	207,335	53,611	187,589		62,237
% Smoke cigarettes regularly	38.2%	60.8%	42.6%	53.7%	n/a	41.6%
<i>N</i>	40,590	104,505	18,947	80,919		20,379
Wave 3						
% Ever smoked a cigarette	n/a	87.7%	78.3%	82.5%	69.1%	78.8%
<i>N</i>		409,762	98,244	249,302	75,525	64,776
% Smoke cigarettes regularly	n/a	77.5%	76.6%	74.6%	51.2%	70.8%
<i>N</i>		272,527	71,781	168,724	22,319	33,510

Table 6: Odds of Tobacco Use by Race with 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Ever smoked	1.13** 1.12-1.15	.89** .88-.90	.74** .73-.75	n/a	.67** .66-.68	.88** .88-.89	1.17** 1.17-1.18	n/a
Smoke regularly	.53** .53-.54	.225** 1.23-1.27	.57** .56-.59	n/a	.55** .54-.56	1.08** 1.07-1.09	1.20** 1.20-1.21	n/a
Wave 3								
Ever smoked	n/a	1.50** 1.48-1.52	.82** .81-.84	.48** .47-.49	.91** .89-.93	.96** .95-.97	1.13** 1.13-1.13	.83** .82-.83
Smoke regularly	n/a	1.20** 1.18-1.21	1.27** 1.25-1.30	.38** .38-.39	1.14** 1.12-1.17	1.18** 1.17-1.20	1.02** 1.02-1.02	.84** .83-.84
Smoked past 30 days	n/a	.73** .72-.74	.96** .94-.98	.16** .15-.16	.60** .58-.61	.88** .87-.89	.94** .93-.94	.67** .67-.67

*p < .05; **p < .01

Table 7: Descriptive Statistics for Race and Alcohol Use

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	White	Black	Black/ White
Wave 1						
Drink > 2-3 times	64.7%	66.2%	65.8%	60.0%	n/a	60.1%
<i>N</i>	134,219	211,789	58,595	171,718		64,664
Drink outside family	68.5%	68.1%	65.5%	73.8%	n/a	70.7%
<i>N</i>	91,900	144,216	38,403	126,718		45,744
Wave 3						
% Drink >2-3 times	n/a	83.7%	80.2%	81.7%	60.6%	95.6%
<i>N</i>		382,070	100,612	241,011	65,555	78,620

Table 8: Odds of Alcohol Use by Race With 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Drink >2-3x	1.19** 1.18-1.21	1.24** 1.11-1.25	1.22** 1.20- 1.24	n/a	.94** .93-.95	.81** .81-.82	1.29** 1.29- 1.30	n/a
Drink outside family	.76** .75-.77	.76** .75-.77	.64** .62-.65	n/a	.88** .86-.89	.85** .84-.85	1.26** 1.26- 1.26	n/a
Wave 3								
Drink >2-3x since W1	n/a	1.17** 1.15-1.18	.90** .88-.91	.33** .32-.33	4.30** 4.16- 4.45	1.13** 1.12- 1.14	1.04** 1.04- 1.05	1.09** 1.09-1.10

*p < .05; **p < .01

Table 9: Descriptive Statistics for Race and Marijuana Use

Wave 1	Hispanic/ Asian/White	Black/ White	American Indian/ White	Asian/ White	White	Black
Ever tried marijuana	34.9%	46.0%	33.7%	46.8%	25.2%	n/a
N	72,068	47,315	107,921	41,657	71,618	
Wave 3						
Marijuana since W1	n/a	55.2%	51.9%	57.9%	57.5%	38.4%
N		44,584	233,089	72,604	169,543	42,035
Marijuana past year	n/a	87.3%	78.9%	75.3%	64.2%	75.1%
N		38,901	182,660	54,648	108,924	31,563

Table 10: Odds of Marijuana Use by Race with 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Used marijuana	1.58** 1.56-1.60	1.45** 1.44-1.47	2.58** 2.54- 2.62	n/a	2.45** 2.42- 2.49	.96** .95-.96	1.16** 1.16- 1.16	n/a
Wave 3								
Used marijuana since W1	n/a	.81** .80-.82	1.00 .99- 1.01	.47** .46-.48	.96** .95-.98	1.59** 1.58- 1.60	.89 .89-.89	1.01** 1.01-1.01
Used marijuana past year	n/a	2.25** 2.22-2.28	2.00** 1.96- 2.04	2.04** 1.99- 2.10	5.77** 5.60- 5.95	1.52** 1.50- 1.54	.94** .94-.94	.82** .82-.82

*p < .05; **p < .01

Table 11: Descriptive Statistics for Race and Cocaine Use

Wave 1	Hispanic/ Asian/ White	Black/ White	American Indian/ White	Asian/ White	White	Black
Tried cocaine	5.2%	2.2%	3.8%	5.5%	5.6%	n/a
N	10,719	2,280	12,150	4,864	15,889	
Wave 3						
Cocaine since W1	n/a	9.6%	14.6%	8.7%	14.5%	8.0%
N		7,754	66,250	10,864	42,824	8,717
Cocaine past year	n/a	77.8%	52.5%	89.7%	64.6%	57.6%
N		6,032	34,798	9,740	27,657	5,019

Table 12: Odds of Cocaine Use by Race with 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Used cocaine	.92** .90-.95	.63** .61-.64	.97 .94- 1.00	n/a	.36** .34-.37	1.21** 1.19- 1.23	1.13** 1.13- 1.14	n/a
Wave 3								
Used cocaine since W1	n/a	.98** .96-.99	.58** .57-.59	.52** .51-.54	.71** .69-.72	.93** .92-.94	1.02** 1.02- 1.02	.88** .88-.88
Used cocaine past year	n/a	.49** .48-.51	4.11** 3.85- 4.39	1.05* 1.00- 1.11	2.02** 1.90- 2.14	.54** .53-.55	.86** .85-.86	1.03** 1.02-1.03

*p < .05; **p < .01

Table 13: Descriptive Statistics for Race and Drugs % Yes

Wave 1	Hispanic/ Asian/ White	Black/ White	American Indian/ White	Asian/ White	White	Black
Tried Inhalants	3.5%	6.5%	10.6%	6.5%	5.6%	n/a
N	7,073	6,673	34,132	5,762	15,579	
Wave 3						
Crystal meth since W1	n/a	5.2%	13.0%	3.4%	7.7%	7.9%
N		4,244	59,218	4,302	22,701	8,600
Crystal meth past year	n/a	41.8%	50.9%	67.3%	46.9%	6.5%
N		1,776	28,885	2,897	10,636	560

Table 14: Odds of Inhalant and Crystal Meth Use by Race with 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Inhalant use	.65** .63-.66	2.15** 2.11-2.20	1.25** 1.21-1.29	n/a	1.23** 1.19- 1.26	1.08** 1.06- 1.09	.89** .89-.90	n/a
Wave 3								
Crystal meth since W1	n/a	1.77** 1.75-1.80	.45** .42-.45	1.05** 1.02-1.08	.73** .70-.75	.83** .82-.84	1.01** 1.01- 1.02	.92** .92-.92
Crystal meth past year	n/a	1.35** 1.30-1.40	2.23** 2.02-2.45	.34** .31-.37	2.60** 2.41- 2.80	.64** .61-.66	.78** .77-.79	.59** .59-.60

*p < .05; **p < .01

Table 15: Descriptive Statistics for Race and Other Illegal Drugs % yes

	Black/White	American Indian/ White	Asian/ White	White	Hispanic/ Asian/ White	Black
Wave 1						
Tried other illegal drugs	5.9%	12.1%	15.9%	13.0%	8.8%	n/a
N	6,040	38,979	14,116	36,987	17,793	
Wave 3						
Tried other illegal drugs since W1	18.5%	23.3%	35.4%	22.8%	n/a	11.2%
N	14,947	104,585	44,388	67,065		12,209
Other drugs past year	83.7%	59.3%	51.0%	49.3%	n/a	59.8%
N	12,518	60,429	22,623	33,091		7,300

Table 16: Odds of Other Illegal Drug Use by Race with 95% Confidence Intervals

	Hispanic/ Asian/ White	American Indian/ White	Asian/ White	Black	Black/ White	Sex	Age	Education
Wave 1								
Used other illegal drugs	.63** .62-.65	.91** .89-.92	1.22** 1.20- 1.25	n/a	.41** .40-.42	.86** .85-.87	1.08** 1.08- 1.08	n/a
Wave 3								
Used other illegal drugs since W1	n/a	1.01* 1.00-1.02	1.89** 1.86- 1.92	.43** .42-.44	.82** .80-.83	1.24** 1.23- 1.25	1.00 1.00- 1.00	.94** .94-.94
Used other illegal drugs past year	n/a	1.70** 1.6-1.73	1.12** 1.10- 1.15	2.32** 2.22- 2.42	8.84** 8.42- 9.27	.99 .98- 1.01	.83** .82-.83	.94** .94-.95

*p < .05; **p < .01

Table 17: Proportion of Minority and Majority Identified by Race

	Wave 1 Minority Identity	Wave 1 Majority Identity	Wave 3 Minority Identity	Wave 3 Majority Identity
Black/White	82.0%	18.0%	82.3%	17.7%
	81,270	17,850	58,872	12,629
American Indian/White	13.4%	86.6%	8.4%	91.6%
	43,187	278,025	38,684	420,214
Asian/White	50.9%	49.1%	39.0%	61.0%
	45,137	43,569	46,516	72,674
Black/American Indian	100%		100%	-
	71,895		50,395	
Black/Asian	100%		100%	-
	16,964		22,141	
Asian/American Indian	100%		100%	-
	6,379		2,989	
Black/Asian/American Indian	100%		100%	-
	4,155		2,479	
White/Black/American Indian			92.5%	7.5%
			17,559	1,414
White/American Indian/Asian			40.5%	59.5%
			2,229	3,276
White/Black/Asian			100%	0%
			3,385	0
White/Black/American Indian/Hispanic			100%	
			369	
White/Black/American Indian/Asian			100%	
			90	
Hispanic/Asian/White	49.8%	50.2%		
	99,852	100,586		
Hispanic/American Indian/Asian	100%			
	1,625			

Hispanic/Black/American Indian	100%
	2,385
Hispanic/Black/American Indian/Other	100%
	1,372
Black/Other	100%
	10,228
Asian/Other	100%
	7,699
Hispanic/Black/Other	100%
	15,461
Hispanic/American Indian/ Other	100%
	11,479
Hispanic/Asian/Other	100%
	3,940
American Indian/Other	100%
	7,486

Table 18: Descriptive Statistics for Minority and White Identified

	Wave 1		Wave 3	
Wave 1	Minority	Not	Minority	Not
Mean grade level*	12.85	12.82	12.96	12.79
SD	1.89	1.81	1.86	2.03
N	305,956	320,897	217,378	137,712
% Female	50.0%	50.8%	46.9%	50.8%
N	215,491	223,322	103,257	70,026
Mean Age	15.93	15.78	22.06	21.66
SD	1.84	1.77	1.90	2.10
N	431,248	439,296	220,371	137,712

*Education was measured at Wave 3

Table 19: Racial Identity and Proportion of Tobacco Use

	Wave 1		Wave 3	
	Minority	White	Minority	White
% Ever smoked a cigarette	64.9%	64.7%	76.4%	87.4%
<i>N</i>	277,972	284,391	189,844	447,462
% Smoke cigarettes regularly	46.6%	48.9%	73.3%	77.6%
<i>N</i>	87,166	117,157	113,245	299,773

Table 20: Odds of Smoking by Identity With 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Ever smoked	1.01*	.85**	1.12**	n/a
	1.00-1.02	.84-.86	1.12-1.13	
Smoked regularly	1.13**	1.33**	1.25**	
	1.12-1.14	1.31-1.35	1.24-1.25	
Wave 3				
Ever smoked	2.10**	.82**	1.11**	.89**
	2.07-2.13	.81-.83	1.10-1.11	.89-.89
Smoked regularly	1.18**	1.34**	1.01**	.83**
	1.16-1.20	1.33-1.36	1.00-1.01	.83-.84
Smoked past 30 days	1.05**	1.32**	.87**	.72
	1.03-1.06	1.31-1.34	.87-.87	.72-.72

Table 21: Racial Identity and Frequency of Tobacco Use

	Wave 1			Wave 3		
	Minority	White	F Sig	Minority	White	F Sig
# days smoked*						
M	9.24	12.35	6479.96	23.67	26.06	5187.30
N	185,382	239,327	.000	95,310	252,252	.000
# smoked per day**						
M	5.12	8.45	10623.69	9.26	14.37	14404.74
N	113,107	161,663	.000	94,199	252,854	.000

Wave 1

*includes those that had ever smoked regularly, at least 1 cigarette every day for 30 days

*During the past 30 days, on how many days did you smoke cigarettes?

**During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?

Wave 3

*includes those that had ever smoked regularly, at least 1 cigarette every day for 30 days and if they have smoked at all in the past 30 days

** includes those that had ever smoked regularly, at least 1 cigarette every day for 30 days and if they have smoked at all in the past 30 days

Table 22: Racial Identity and Proportion of Alcohol Use

	Wave 1		Wave 3	
	Minority	White	Minority	White
Wave 1				
% Drink alcohol > 2-3 times*	59.2%	65.8%	84.1%	85.1%
N	254,528	288,388	203,972	427,642
% Drink alcohol outside family**	68.4%	70.0%	n/a	n/a
N	174,069	201,752		

*Have you had a drink of beer, wine, or liquor-not just a sip or a taste of someone else's drink-more than 2 or 3 times in your life? (Wave 3 included additional instruction at beginning "Since June 1995, have you...")

**Do you ever drink beer, wine, or liquor when you are not with your parents or other adults in your family?

Table 23: Odds of Drinking by Identity With 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Drink > 2-3 times	1.40** 1.38-1.41	.94** .94-.95	1.29** 1.28-1.29	n/a
Drink outside family	1.17** 1.16-1.19	.94** .93-.95	1.38** 1.37-1.38	n/a
Wave 3				
Drink >2-3 times	1.23** 1.22-1.25	.71** .70-.72	1.08** 1.07-1.08	1.19** 1.19-1.19

Table 24: Frequency of Alcohol Use by Racial Identity

	Wave 1			Wave 3		
	Minority M	White	F Sig	Minority	White	F Sig
# drinks do you usually each time?*	6.00 210,622	6.12 246,750	26.02, .000	4.21 183,712	4.54 397,214	1397.11, .000

*Think of all the times you have had a drink during the past 12 months. How many drinks did you usually have each time? A “drink” is a glass of wine, a can of beer, a wine cooler, a shot glass of liquor, or a mixed drink.

Only includes those who report having ever had a drink of beer, wine, or liquor more than 2 or 3 times in their life AND having had any in the past 12 months

*Wave 3

Only includes those who report having had a drink of beer, wine, or liquor more than two or three times since June 1995 AND having had any alcohol in the past 12 months

Table 25: Racial Identity and Drugs Proportion Who Said Yes

	Minority	White
Wave 1		
Ever tried marijuana?	39.4%	35.0%
N	167,298	152,630
Wave 3		
Used Marijuana since W1	50.0%	54.7%
N	122,623	270,047
Used marijuana in past year?	77.1%	77.9%
N	94,563	209,136

Table 26: Odds Ratios for Marijuana Use by Identity and 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Ever use marijuana*	.85** .84-.85	1.23** 1.22-1.24	1.18** 1.18-1.18	n/a
Wave 3				
Used marijuana since W1	1.09** 1.08-1.10	1.49** 1.47-1.50	.85** .85-.86	1.04** 1.04-1.05
Used marijuana past year**	.89** .87-.90	1.59** 1.56-1.61	.92** .92-.93	.84** .84-.84

*How old were you when you tried marijuana for the first time? If you never tried marijuana, enter "0." This item was recoded so that anyone who responded "0" was coded as never having tried marijuana and anyone who responded with an age at which they tried marijuana was coded as a "1" indicating yes they had tried marijuana in their life

**Only includes those individuals who have used marijuana since Wave 1

Table 27: Frequency of Marijuana Use by Racial Identity

	Wave 1			Wave 3		
	Minority M,N	White	F, sig	Minority M,N	White	F sig
Lifetime marijuana use	55.78 158,898	30.21 134,057	3907.48, .000	n/a	n/a	n/a
Past 30 days, times used marijuana*	17.14 168,080	6.99 153,189	1876.66, .000	10.60 93,422	13.07 205,472	368.14, .000

*Wave 1 includes those that have used marijuana in the past 30 days

*Wave 3 only includes those that have used marijuana since June 1995 and within the past year

Table 28: Descriptive Statistics for Cocaine Use by Identity

	Minority	White
Wave 1		
Ever tried cocaine? *	2.6%	5.1%
<i>N</i>	11,207	22,144
Wave 3		
Used Cocaine? **	11.6%	12.1%
	28,677	60,411
Cocaine in the past year?***	70.2%	57.9%
	20,133	34,967

*How old were you when you tried any kind of cocaine-including powder, freebase, or crack cocaine-for the first time?

**Since June 1995, have you used any kind of cocaine-including crack, freebase, or powder? (yes/no)

***In the past year, have you used any kind of cocaine? (yes/no)

Table 29: Odds of Cocaine Use by Identity With 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Ever use cocaine	2.07** 2.02-2.11	1.99** 1.94-2.04	1.14** 1.13-1.15	n/a
Wave 3				
Used cocaine since W1	.97** .96-.97	.62** .61-.63	.94** .94-.95	.83** .83-.84
Used cocaine past year*	.55** .53-.57	.53** .51-.54	1.12** 1.11-1.13	1.02** 1.02-1.03

*If yes to having used any kind of cocaine since June 1995, was asked if they have used any kind of cocaine in the past year

Table 30: Frequency of Cocaine Use by Identity

	Minority M	White	F, sig
Wave 1			
Lifetime cocaine use*			
M	2.52	2.49	1.25,
N	11,206	22,144	.263
Wave 3			
Past 30 days, times used cocaine**			
M	1.37	.67	1740.26,
N	19,125	33,119	.000

*During your life, how many times have you used cocaine?

**During the past 30 days, how many times have you used any kind of cocaine?

*Wave 1

Answered this question with a number of times if it was not a refusal, legitimate skip, don't know, not applicable, or missing

**Wave 3

Received this question if they said yes they have used any kind of cocaine since June 1995 and yes they have used cocaine in the past year

Table 31: Descriptive Statistics for Use of Other Illegal Drugs

	Minority	White
Wave 1		
Ever tried any other type of illegal drug*	7.1 %	12.3%
N	30,140	53,749
Wave 3		
Since W1 used other drugs?**	16.9%	25.9%
N	41,491	128,107
Past year used other drugs? ***	82.1%	53.7%
N	34,078	67,363

*How old were you when you first tried any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor's prescription? If you never tried any other type of illegal drug, enter "0."

**Since June 1995, have you used any other types of illegal drugs, such as LSD, PCP, ecstasy, mushrooms, inhalants, ice, heroin, or prescription medicines not prescribed for you?

***In the past year, have you used any of these types of illegal drugs?

Table 32: Odds for Use of Other Illegal Drugs by Identity With 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Used other illegal drugs	1.90** 1.87-1.93	1.02** 1.01- 1.04	1.18** 1.17- 1.18	n/a
Wave 3				
Used other illegal drugs since W1	1.68** 1.66-1.70	1.06** 1.05- 1.07	1.03** 1.02- 1.03	.96** .96-.97
Used other illegal drugs in past year	.22** .21-.22	1.82** 1.79- 1.86	.92** .92-.93	.95** .94-.95

*How old were you when you first tried any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor's prescription? If you never tried any other type of illegal drug, enter "0."

*In the past year, have you used any of these types of illegal drugs?

Participants were not asked this question if they did not respond yes to having used any other types of illegal drugs since June 1995

Table 33: Mean Use of Other Illegal Drugs by Identity

	Wave 1			Wave 3		
	Minority M	White	F, sig	Minority M	White	F Sig
Lifetime use of other illegal drugs*	82.21 30,138	17.92 51,217	3024.08, .000	n/a	n/a	n/a
Use of other illegal drugs past 30 days **	1.82 30,138	2.08 54,054	76.17, .000	3.67 34,081	2.17 65,515	2631.64 .000

*In order to examine lifetime use of other illegal drugs, only those individuals who had ever used other illegal drugs were included in the analysis, anyone who responded with a zero was excluded

** Individuals who responded that they had not used other illegal drugs within the past 30 days were excluded from the analyses

Table 34: Descriptive Statistics for Inhalant/Crystal Meth Use

	Minority	White
Wave 1		
Ever tried inhalants?	7.0%	7.2%
N	29,631	31,546
Used Inhalants	n/a	n/a
Wave 3		
Crystal meth since W1	8.6%	9.6%
N	21,169	48,097
Crystal meth past year	66.0%	49.1%
N	13,961	22,421

Table 35: Odds of Inhalant and Crystal Meth Use by Identity With 95% Confidence Intervals

	Minority Identified	Sex	Age	Education
Wave 1				
Use inhalants	1.01 1.00-1.03	1.58** 1.55-1.60	.83** .82-.83	n/a
Wave 3				
Used crystal meth since W1	1.06** 1.04-1.07	.81** .79-.82	1.00 1.00-1.01	.84** .84-.85
Used crystal meth past year	.51** .49-.53	.87** .84-.89	.88** .88-.89	.71** .70-.72

Table 36: Frequency of Use of Inhalants/Crystal Meth by Identity

	Minority	White	F, sig
Wave 1	M		
Lifetime use of inhalants *	33.00 28,529	38.96 31,546	13.34, .000
Past 30 days inhalant use**	1.65 7,345	1.67 7,742	.576, .448
Wave 3			
Past 30 days times used meth***	1.68 11,328	2.93 12,106	1767.26, .000

*Lifetime use of inhalants was answered by anyone who did not refuse, legitimate skip, don't know, not applicable, or missing response to the question

**Past 30 days how many times used inhalants was answered by anyone who did not refuse, legitimate skip, don't know, not applicable, or missing response to the question

***Responded to question if yes used crystal meth since June 1995 and yes used crystal meth in past year

Table 37: Descriptive Statistics for Change

	Wave 1		Wave 3	
	Change	No change	Change	No change
% female	51.5%	52.9%	49.4%	48.9%
N	496,081	60,461	628,156	74,178
Age	15.67	16.01	21.65	21.90
SD	2.08	1.89	1.83	1.97
N	962,457	114,288	1,272,180	151,715
Education at Wave 3	12.78	13.12	12.82	13.19
SD	1.88	2.22	1.87	2.25
N	958,780	112,725	1,272,180	148,722

Table 38: Descriptive Statistics for Change and Smoking

	Wave 1		Wave 3	
	Change	No change	Change	No change
Ever smoked a cigarette	64.3%	65.3%	79.8%	90.2%
N	617,481	746,56	1,013,306	136,852
Smoked cigarettes regularly	51.2%	50.5%	71.8%	77.0%
N	234,243	28,072	615,298	88,572

Table 39: Odds of Smoking by Change and 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Ever smoked	1.01 1.00-1.02	.96** .95-.97	1.17** 1.17-1.78	n/a
Smoke regularly	1.03** 1.01-1.05	1.24** 1.22-1.25	1.31** 1.30-1.31	n/a
Wave 3				
Ever smoked	.31** .30-.32	1.28** 1.27-1.29	1.09** 1.09-1.10	.81** .81-.81
Smoke regularly	.72** .71-.73	1.15** 1.14-1.16	1.04** 1.04-1.05	.83** .83-.84
Smoked past 30 days	.83** .81-.84	.98** .97-.99	.97** .96-.97	.69** .69-.69

Table 40: Mean Smoking by Change

	Wave 1			Wave 3		
	Changed M,N	No change	F Sig	Changed M,N	No change	F Sig
Past 30 days-# days smoked*	11.75 453,670	7.79 55,629	4935.76 .000	26.62 435,949	23.11 63,169	10323.50 .000
During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?	7.11 297,154	6.67 29,750	80.57 .000	13.71 435,629	11.18 63,169	1639.51 .000

Table 41: Proportion of Alcohol Use by Change

	Change	No Change
Wave 1		
% Drink alcohol > 2-3 times	58.0%	75.2%
<i>N</i>	555,903	85,990
% Drink alcohol outside family	71.5%	65.3%
<i>N</i>	397,383	56,160
Wave 3		
% Drink alcohol >2-3 times since W1	79.9%	87.8%
<i>N</i>	998,789	129,337

Table 42: Odds of Drinking by Change With 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Drink >2-3 times	.47**	.89**	1.29**	n/a
	.47-.48	.88-.89	1.28-1.29	
Drink outside family	1.39**	.73**	1.24**	n/a
	1.36-1.41	.72-.74	1.24-1.24	
Wave 3				
Drink >2-3 times since W1	.57**	1.14**	1.00**	1.14**
	.56-.58	1.13-1.15	.99-1.00	1.13-1.14

Table 43: Mean Alcohol Use by Change

	Wave 1			Wave 3		
	Change M	No Change	F Sig	Change	No change	F Sig
# drinks do you usually each time?	5.93 463,610	6.25 70,369	86.64 .000	4.66 911,967	4.97 121,534	792.89 .000

Table 44: Proportion Using Marijuana by Change

	Change	No change
<hr/>		
Wave 1		
Ever tried marijuana?	30.7%	47.1 %
<i>N</i>	293,110	53,819
<hr/>		
Wave 3		
Used Marijuana since W1	51.8%	53.1%
<i>N</i>	640,779	80,509
Used marijuana in past year	73.5%	86.3%
<i>N</i>	469,937	69,463
<hr/>		

Table 45: Odds of Marijuana Use by Change with 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Used marijuana	.52**	1.13**	1.23**	n/a
	.51-.52	1.12-1.14	1.22-1.23	
Wave 3				
Used marijuana since W1	.89**	1.70**	.92**	.99**
	.88-.90	1.69-1.72	.92-.92	.99-.99
Used marijuana past year	.41**	1.17**	.87**	.88**
	.40-.42	1.16-1.18	.87-.88	.88-.88

Table 46: Mean Rate of Marijuana Use by Change

	Wave 1			Wave 3		
	Changed	No change	F Sig	Changed	No change	F Sig
During your life, how many times used marijuana?	37.61 263,770	38.56 47,028	3.67 .055	n/a	n/a	n/a
Past 30 days, times used marijuana	5.53 294,313	3.85 53,762	941.93 .000	9.67 463,839	21.98 69,465	13006.58 .000

Table 47: Descriptive Statistics for Cocaine Use by Change

	Change	No change
Wave 1		
Ever tried cocaine?	4.9%	1.1%
N	47,256	1,313
Wave 3		
Used Cocaine since W1	13.0%	7.6%
N	161,647	11,590
Cocaine in past year	62.3%	58.2%
N	100,781	6,742

Table 48: Odds of Cocaine Use by Change with 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Used cocaine	4.64**	.77**	1.11**	n/a
	4.39-4.91	.76-.78	1.10-1.11	
Wave 3				
Used cocaine since W1	1.74**	1.02**	1.00*	.95*
	1.70-1.77	1.01-1.04	.99-1.00	.94-.95
Used cocaine in past year	1.35**	.67**	.89**	1.12**
	1.30-1.40	.66-.68	.89-.90	1.11-1.12

Table 49: Mean Cocaine Use by Change

	Changed	No change	F Sig
Wave 1			
Lifetime cocaine use			
M	2.13	3.61	504.18
N	44,658	1,312	.000
Wave 3			
Past 30 days, times used cocaine			
M	1.67	1.00	174.95
N	97,925	6,743	.000

Table 50: Descriptive Statistics for Use of Other Illegal Drugs by Change

	Change	No change
Wave 1		
Ever tried any other type of illegal drug?	10.7%	6.2%
N	102,408	7,105
Wave 3		
Used other drugs since W1	22.3%	20.3%
N	275,412	30,735
Used other drugs past year	54.9%	68.8%
N	149,784	21,149

Table 51: Odds of Other Illegal Drug Use by Change and 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Use of Other Illegal Drugs	1.88**	.85**	1.10**	n/a
	1.83-1.93	.84-.86	1.09-1.10	
Wave 3				
Use of Other Illegal Drugs since W1	1.08**	1.33**	.93**	.99**
	1.07-1.10	1.32-1.34	.93-.93	.99-.99
Use of Other Illegal Drugs Past Year	.54**	1.19**	1.02**	.94**
	.52-.55	1.17-1.21	1.02-1.03	.94-.94

Table 52: Mean Use of Other Illegal Drugs by Change*

	Wave 1			Wave 3		
	Change	No change	F Sig	Change	No change	F Sig
Lifetime use of other illegal drugs	38.37 91,153	142.71 7,104	2944.68, .000	n/a	n/a	
Use of other illegal drugs past 30 days	10.76 44,832	-3.49 4,419	3417.42, .000	2.50 147,861	6.92 21,151	9837.56, .000

*Those who did not report use of other illegal drugs were removed from the analysis

Table 53: Descriptive Statistics for Inhalant and Crystal Meth Use by Change

	Change	No change
Wave 1		
Ever tried inhalants	6.1%	7.2%
N	58,154	8,234
Wave 3		
Used Crystal Meth Since W1	9.1%	3.7%
N	113,695	5,541
Crystal meth past year	46.3%	89.0%
N	51,484	4,932

Table 54: Odds of Inhalant/Crystal Meth Use by Change and 95% Confidence Intervals

	No change	Sex	Age	Education
Wave 1				
Use of Inhalants	.79**	1.02*	.88**	n/a
	.78-.81	1.00-1.03	.87-.88	
Wave 3				
Use of Crystal Meth Since W1	2.57**	1.13**	1.03**	.94**
	2.50-2.64	1.12-1.15	1.03-1.04	.94-.94
Use of Crystal Meth in Past Year	.07**	1.00	.72**	.68**
	.06-.08	.97-1.02	.71-.73	.67-.68

Table 55: Mean Inhalant/Crystal Meth Use by Change

	Change	No change	F Sig
Wave 1			
Lifetime use of inhalants (0 not included)	15.70 55,855	122.66 8,234	5237.798 .000
Past 30 days inhalant use	1.81 12,445	1.49 2,787	155.46 .000
Wave 3			
Past 30 days times used meth	3.08 30,546	2.11 3,009	251.19 .000

Table 56: Substances and Change

	Who is More Likely to?
W1: Ever smoke	No difference
W1: Smoke regularly	No changers
W3: Ever smoke	Changers
W3: Smoke regularly	Changers
W3: Smoke past 30 days	Changers
W1: Drink > 2-3 times	Changers
W3: Drink > 2-3 times	Changers
W1: Tried marijuana	Changers
W3: Used marijuana since W1	Changers
W3: Used marijuana in past year	Changers
W1: Tried cocaine	No changers
W3: Cocaine since W1	No changers
W3: Used cocaine in past year	No changers
W1: Tried other drugs	No changers
W3: Used other drugs since W1	No changers
W3: Used other drugs in past year	Changers
W1: Tried inhalants	Changers
W3: Used crystal meth since W1	No changers
W3: Used crystal meth in past year	Changers

Figure 1: Racial Identity Theory Model-modified

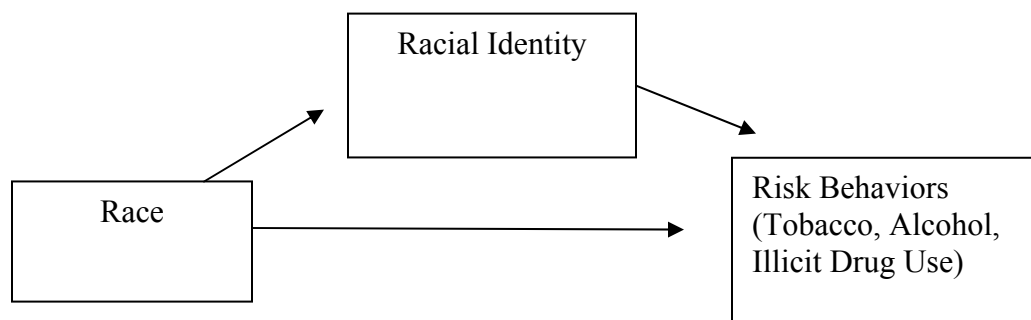


Figure 2: Research Question 2

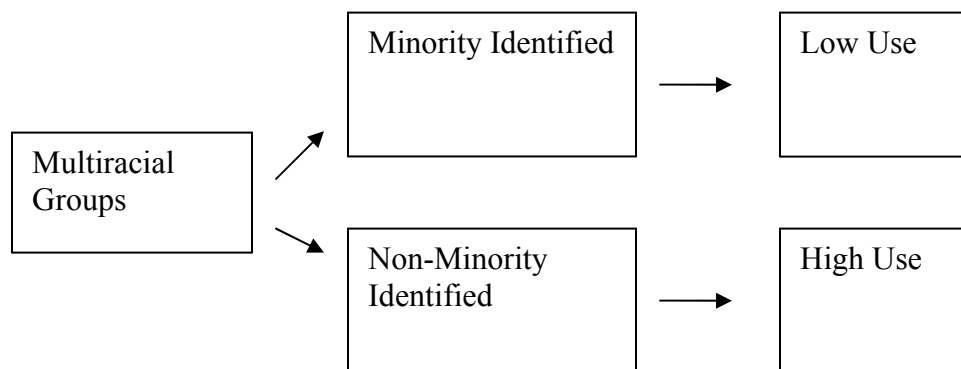
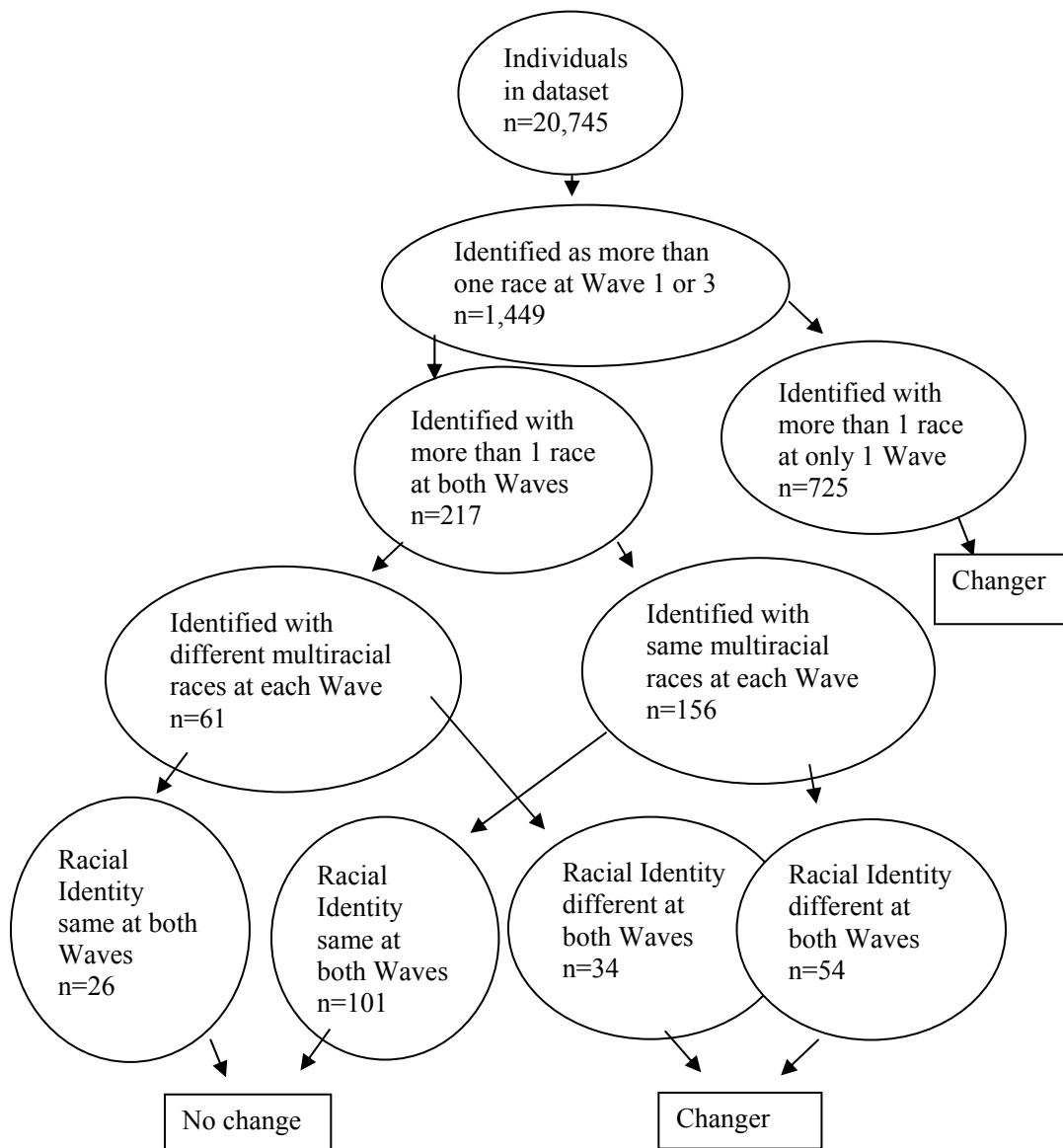


Figure 3: Unweighted Description of Change Category



Appendix A: Wave 1 Questions

What is your race? You may give more than one answer

White
Black or African American
American Indian or Native American
Asian or Pacific Islander
Other

Which one category best describes your racial background?

White
Black or African American
American Indian or Native American
Asian or Pacific Islander
Other

From Section 28: Tobacco, Alcohol, Drugs-Audio CASI

1. Have you ever tried cigarette smoking, even just 1 or 2 puffs?

No (skip to q9)
Yes

3. Have you ever smoked cigarettes regularly, that is, at least 1 cigarette every day for 30 days?

No (skip to q5)
Yes

5. During the past 30 days, on how many days did you smoke cigarettes?

Range

7. During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?

Range

12. Have you ever had a drink of beer, wine, or liquor-not just a sip or a taste of someone else's drink-more than 2 or 3 times in your life?

No (skip to q29)
Yes

13. Do you ever drink beer, wine, or liquor when you are not with your parents or other adults in your family?

No (skip to q15)
Yes

16. Think of all the times you have had a drink during the past 12 months. How many drinks did you usually have each time? (A “drink” is a glass of wine, a can of beer, a wine cooler, a shot glass of liquor, or a mixed drink.)

Range

30. How old were you when you tried marijuana for the first time? If you never tried marijuana, enter “0.”

0 or Age

31. During your life, how many times have you used marijuana?

Range

32. During the past 30 days, how many times did you use marijuana?

Range

34. How old were you when you tried any kind of cocaine- including powder, freebase, or crack cocaine- for the first time? If you never tried cocaine, enter “0.”

0 or Age

35. During your life, how many times have you used cocaine?

Range

37. How old were you when you tried inhalants, such as glue or solvents, for the first time? If you never tried inhalants such as these, enter “0.”

0 or Age

38. During your life, how many times have you used inhalants, such as glue or solvents?

Range

39. During the past 30 days, how many times did you use inhalants?

Range

40. How old were you when you first tried any other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor’s prescription? If you never tried any other type of illegal drug, enter “0.”

0 or Age

41. During your life, how many times have you used any of these types of illegal drugs?

Range

42. During the past 30 days, how many times did you use any of these types of illegal drugs?

Range

Appendix B: Wave 3 Questions

4. What is your race? You may give more than one answer.

White

Black or African American

American Indian or Native American

Asian or Pacific Islander

If there is >1 answer to q4, ask q 6

6. Which one category best describes your racial background?

White

Black or African American

American Indian or Native American

Asian or Pacific Islander

Section 28: Tobacco, Alcohol, Drugs, Self-Image (CASI)

1. Have you ever tried cigarette smoking, even just one or two puffs?

No (skip to q 27)

Yes

4. Have you ever smoked cigarettes regularly-that is, at least one cigarette every day for 30 days?

No (skip to q 18)

Yes

6. Have you ever smoked at all in the past 30 days?

No (skip to q 18)

Yes

7. During the past 30 days, on how many days did you smoke cigarettes?

Range

10. During the past 30 days, on the days you smoked, how many cigarettes did you smoke each day?

Range

37. Since June 1995, have you had a drink of beer, wine, or liquor more than two or three times? Do not include sips or tastes from someone else's drink

No (skip to q 50)

Yes

39. Think of all the times you have had a drink during the past 12 months. How many drinks did you usually have each time? A "drink" is a glass of wine, a can of beer, a wine cooler, a shot glass of liquor, or a mixed drink.

Range

108. Since June 1995, have you used marijuana?

No (skip to q 111)

Yes

109. In the past year, have you used marijuana?

No (skip to q 111)

Yes

110. During the past 30 days, how many times have you used marijuana?

Range

111. Since June 1995, have you used any kind of cocaine- including crack, freebase, or powder?

No (skip to q 114)

Yes

112. In the past year, have you used any kind of cocaine?

No (skip to q 114)

Yes

113. During the past 30 days, how many times have you used any kind of cocaine?

Range

114. Since June 1995, have you used crystal meth?

No (skip to q 117)

Yes

115. In the past year, have you used crystal meth?

No (skip to q 117)

Yes

116. During the past 30 days, how many times have you used crystal meth?

Range

117. Since June 1995, have you used any other types of illegal drugs, such as LSD, PCP, ecstasy, mushrooms, inhalants, ice, heroin, or prescription medicines not prescribed for you?

No (skip to q 120)

Yes

118. In the past year, have you used any of these types of illegal drugs?

No (skip to q 120)

Yes

119. During the past 30 days, how many times have you used any of these types of illegal drugs?
Range

Appendix C: IRB Approval



Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and expires on October 26, 2010. The Assurance number is FWA00005960.

Principal Investigator: CRUMLY, JULIE K
Co-Investigator(s):
Protocol Number: **X070913007**
Protocol Title: *Racial Identity and High Risk Behaviors in Mixed Race Individuals*

The IRB reviewed and approved the above named project on 8-27-08. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 8-27-08

Date IRB Approval Issued: 8-27-08

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1530 3RD AVE S
BIRMINGHAM AL 35294-0104

Appendix D: Unweighted Odds Ratios with 95% Confidence Intervals for Research Question 1 Wave 1

	Black/ White	American Indian/ White	Asian/ White	Hispanic/ Asian/ White	Sex	Age
Ever smoked	.72 (.46-1.13)	.94 (.64-1.39)	.54** (.34-.86)	.85 (.58-1.25)	.75* (.58-.98)	1.15** (1.07-1.24)
Smoked regularly	.58 (.30-1.13)	1.18 (.70-1.99)	.65 (.33-1.29)	.51* (.30-.86)	.95 (.65-1.37)	1.30** (1.16-1.47)
Drink >2-3 times	.70 (.45-1.10)	1.12 (.76-1.65)	.78 (.49-1.24)	1.19 (.80-1.75)	.83 (.64-1.09)	1.30** (1.20-1.41)
Drink outside family	.85 (.44-1.65)	.76 (.45-1.29)	.88 (.45-1.73)	.82 (.48-1.39)	.83 (.58-1.19)	1.23** (1.10-1.37)
Used marijuana	1.41 (.89-2.24)	1.32 (.89-1.97)	1.59* (.99-2.55)	1.36 (.92-2.02)	.98 (.75-1.28)	1.25** (1.15-1.35)
Used cocaine	.11* (.01-.88)	.89 (.39-1.93)	.79 (.29-2.16)	.80 (.36-1.81)	.87 (.47-1.58)	1.32** (1.09-1.58)
Used inhalants	.46 (.18-1.18)	1.19 (.63-2.23)	.90 (.40-2.01)	.58 (.28-1.20)	.98 (.61-1.57)	1.03 (.90-1.17)
Used other illegal drugs	.38* (.17-.83)	.76 (.45-1.31)	1.05 (.56-1.94)	.65 (.37-1.13)	.72 (.49-1.06)	1.22** (1.08-1.37)

*p<.05

**p<.01

Appendix E: Unweighted Odds Ratios with 95% Confidence Intervals for Research Question 1 Wave 3

	Black/ White	Asian/ White	American Indian/ White	Black	Sex	Age	Education
Ever smoked	.83 (.43- 1.60)	.86 (.46- 1.58)	1.22 (.72- 2.08)	.39** (.23- .67)	.98 (.68- 1.42)	1.10 (.99- 1.23)	.88** (.80-.97)
Smoked regularly	.83 (.41- 1.71)	1.10 (.58- 2.09)	.85 (.51- 1.42)	.39** (.20- .78)	.84 (.57- 1.24)	.97 (.87- 1.09)	.77** (.70-.86)
Smoked past 30 days	.53 (.25- 1.12)	.65 (.32- 1.31)	.53* (.30-.94)	.14** (.07- .28)	1.04 (.69- 1.56)	.95 (.84- 1.07)	.76** (.68-.85)
Drink >2-3 times since Wave 1?	2.11 (.92- 4.84)	.95 (.51- 1.77)	1.23 (.73- 2.05)	.38** (.22- .64)	1.34 (.92- 1.94)	1.03 (.92- 1.14)	1.14** (1.03- 1.27)
Used marijuana since Wave 1?	.92 (.55- 1.53)	1.18 (.73- 1.90)	.83 (.57- 1.22)	.54 (.34- .86)	1.45 (1.09- 1.92)	.95 (.87- 1.03)	.96 (.89-1.04)
Used marijuana past year	1.63 (.72- 3.71)	1.21 (.60- 2.44)	1.37 (.76- 2.47)	.92 (.44- 1.89)	1.45 (.92- 2.26)	.87* (.76- 1.00)	.93 (.83-1.04)
Used cocaine since Wave 1	.55 (.25- 1.22)	.73 (.37- 1.44)	1.06 (.64- 1.76)	.22** (.09- .55)	.77 (.51- 1.16)	.98 (.81- 1.01)	.91 (.81-1.01)
Used cocaine past year	1.04 (.21- 5.22)	3.22 (.59- 17.65)	.68 (.26- 1.77)	2.28 (.22- 23.25)	.93 (.40- 2.14)	.84 (.64- 1.10)	1.18 (.96-1.45)
Used meth since Wave 1?	.40 (.13- 1.22)	.73 (.31- 1.69)	1.59 (.87- 2.86)	.44 (.18- 1.11)	.67 (.42- 1.08)	1.01 (.88- 1.15)	.90 (.79-1.02)
Used meth past year	4.06 (.32- 17.65)	.76 (.13- 5.22)	.95 (.31- 3.22)	1.10 (.16- 8.44)	1.21 (.64- 2.14)	.86 (.64- 1.10)	.77 (.57-1.03)

	51.92)	4.31)	2.94)	7.60)	1.17)	1.17)	
Used other	.53	1.15	.94	.31**	.98	1.02	.94
illegal drugs	(.27-	(.67-	(.60-	(.15-	(.69-	(.92-	(.86-1.03)
since W1	1.06)	1.98)	1.47)	.62)	1.39)	1.13)	
Used other	4.58	1.07	.91	2.51	.84	.88	.95
illegal drugs	(.87-	(.41-	(.41-	(.55-	(.44-	(.72-	(.80-1.13)
past year	24.18)	2.83)	2.03)	11.44)	1.62)	1.09)	

*p=<.05

**p=<.01

Appendix F: Unweighted Proportions of Minority Identification by Race

	Wave 1 Minority Identified	Wave 1 Majority Identified	Wave 3 Minority Identified	Wave 3 Majority Identified
Black/White	75.0%	25.0%	79.0%	21.0%
	96	32	64	17
American Indian/White	15.4%	84.6%	14.0%	86.0%
	40	220	40	245
Asian/White	49.2%	50.8%	55.8%	44.2%
	60	62	63	50
Black/American Indian	100%	-	91.2%	8.8%
	108		52	5
Black/Asian	100%	-	100%	-
	26		19	
Asian/American Indian	100%	-	100%	-
	6		5	
Black/Asian/American Indian	100%	-	100%	-
	3		3	
White/Black/American Indian	n/a	n/a	92%	8.0%
			23	2
White/American Indian/Asian	n/a	n/a	33.3%	66.7%
			2	4
White/Black/Asian	n/a	n/a	100%	-
			1	
White/Black/American Indian/Hispanic	n/a	n/a	100%	-
			1	
White/Black/American Indian/Asian	n/a	n/a	100%	-
			1	
Hispanic/Asian/White	33%	43.4%	n/a	n/a
	85	111		
Hispanic/American Indian/Asian	100%	-	n/a	n/a
	2			
Hispanic/Black/American Indian	100%	-	n/a	n/a
	3			
Hispanic/Black/American Indian/Other	100%	-	n/a	n/a
	3			
Black/Other	100%	-	n/a	n/a
	23			
Asian/Other	100%	-	n/a	n/a
	12			
Hispanic/Black/Other	100%	-	n/a	n/a
	25			
Hispanic/American Indian/Other	100%	-	n/a	n/a
	16			
Hispanic/Asian/Other	100%	-	n/a	n/a

American Indian/Other	8 100% 2	-	n/a	n/a
-----------------------	----------------	---	-----	-----

Wave 1 $\chi^2 = 1256.83$, $p = .000$

Wave 3: $\chi^2 = 770.56$, $p = .000$

Appendix G: Unweighted Odds Ratios with 95% Confidence Intervals for Research
Question 2 Wave 1

	Minority Identified	Sex	Age
Ever smoked	1.09 (.84-1.42)	.75* (.58-.97)	1.13** (1.04-1.22)
Smoked regularly	1.07 (.73-1.56)	1.06 (.73-1.56)	1.38** (1.23-1.56)
Drink >2-3 times	1.28 (.98-1.67)	.77* (.59-1.00)	1.35** (1.24-1.46)
Drink outside family	1.42 (.99-2.04)	.83 (.57-1.19)	1.32** (1.18-1.47)
Used marijuana	.99 (.76-1.29)	1.03 (.79-1.34)	1.27** (1.18-1.38)
Used cocaine	2.28** (1.18-4.41)	1.03 (.54-1.98)	1.31** (1.07-1.60)
Used inhalants	1.53 (.94-2.50)	1.00 (.61-1.65)	1.01 (.88-1.17)
Used other illegal drugs	2.34** (1.52-3.59)	.73 (.48-1.12)	1.29** (1.13-1.47)

*p=<.05

**p=<.01

Appendix H: Unweighted Means for Research Question 2 Wave 1

	Minority	White	F, sig
# days smoked	9.16	12.39	7.78
N	236	220	.00
# smoked per day	5.37	8.47	10.43
N	141	147	.00
# drinks do you usually each time?	6.80	5.73	1.43
N	282	226	.23
Lifetime marijuana use	40.44	43.94	.09
N	213	141	.77
Past 30 days, times used marijuana	9.77	6.52	.69
N	223	162	.41
Lifetime cocaine use	2.92	3.67	.54
N	15	24	.47
Lifetime use of other illegal drugs	62.80	23.41	1.37
N	39	56	.24
Use of other illegal drugs past 30 days	4.14	1.67	3.31
N	39	60	.07
Lifetime use of inhalants	32.83	20.37	.173
N	32	35	.68
Past 30 days inhalant use	4.53	2.81	.35
N	10	7	.56

Appendix I: Unweighted Odds Ratios Research Question 2 Wave 3

	Minority Identified	Sex	Age	Education
Ever smoked	1.40 (.92-2.14)	.91 (.60-1.38)	1.16* (1.02-1.31)	.85** (.76-.95)
Smoked regularly	1.16 (.74-1.83)	.82 (.52-1.29)	.97 (.85-1.11)	.77** (.68-.86)
Smoked past 30 days	.96 (.61-1.52)	1.33 (.84-2.11)	.90 (.79-1.03)	.77** (.68-.87)
Drink >2-3 times since Wave 1?	1.06 (.67-1.67)	.98 (.62-1.53)	1.08 (.95-1.23)	1.16* (1.03-1.32)
Used marijuana since Wave 1?	.81 (.58-1.13)	1.43* (1.02-1.99)	.94 (.86-1.04)	.94 (.86-1.03)
Used marijuana past year	1.20 (.71-2.03)	1.36 (.80-2.31)	.88 (.75-1.03)	.94 (.83-1.07)
Used cocaine since Wave 1	1.00 (.62-1.61)	.65 (.40-1.06)	.96 (.84-1.10)	.85* (.75-.97)
Used cocaine past year	.93 (.37-2.34)	1.11 (.42-2.95)	.93 (.69-1.25)	1.26* (1.00-1.59)
Used meth since Wave 1?	1.09 (.64-1.86)	.66 (.38-1.14)	1.04 (.89-1.21)	.84* (.72-.97)
Used meth past year	1.16 (.41-3.23)	1.69 (.57-4.95)	.96 (.69-1.36)	.88 (.63-1.22)
Used other illegal drugs since Wave 1	1.43 (.95-2.17)	.82 (.54-1.23)	1.08 (.96-1.21)	.95 (.85-1.05)
Used other illegal drugs past year	.27** (.12-.64)	1.37 (.62-3.03)	.96 (.74-1.23)	.98 (.81-1.18)

*p=<.05

**p=<.01

 Appendix J: Unweighted Means for Research Question 2 Wave 3

	Minority	White	F, sig
# days smoked	23.92	25.60	1.86
N	106	139	.17
# smoked per day	9.20	13.34	10.09
N	104	139	.00
# drinks do you usually each time?	4.24	4.27	.010
N	215	249	.92
Past 30 days, times used marijuana	10.43	18.09	1.41
N	112	127	.24
Past 30 days, times used cocaine	2.22	.72	3.64
N	23	25	.06
Use of other illegal drugs past 30 days	1.90	2.13	.07
N	37	34	.80
Past 30 days times used meth	1.72	3.22	1.05
N	15	19	.31

Appendix K: Unweighted Odds Ratios Research Question 3 Wave 1

	No change	Sex	Age
Ever smoked	1.23 (.85-1.78)	.81 (.63-1.03)	1.19** (1.11-1.28)
Smoked regularly	.87 (.49-1.54)	1.08 (.76-1.54)	1.38** (1.23-1.55)
Drink >2-3 times	.77 (.52-1.13)	.88 (.69-1.12)	1.27** (1.19-1.37)
Drink outside family	1.26 (.77-2.06)	.75 (.53-1.06)	1.26** (1.14-1.39)
Used marijuana	.63** (.43-.92)	1.04 (.81-1.34)	1.31** (1.22-1.41)
Used cocaine	2.19 (.67-7.15)	.75 (.42-1.32)	1.28** (1.09-1.51)
Used inhalants	1.19 (.56-2.54)	1.17 (.74-1.84)	1.03 (.91-1.16)
Used other illegal drugs	1.07 (.58-1.96)	.84 (.57-1.23)	1.24** (1.11-1.40)

*p=<.05

**p=<.01

Appendix L: Unweighted Means Research Question 3 Wave 1

	Change	No change	F, sig
# days smoked	10.97	10.58	.05,
N	470	56	.83
# smoked per day	6.63	6.48	.01,
N	294	35	.91
# drinks do you usually each time?	6.08	6.97	.56,
N	504	77	.45
Lifetime marijuana use	42.20	44.47	.02,
N	322	55	.88
Past 30 days, times used marijuana	6.07	8.52	1.24,
N	353	59	.27
Lifetime cocaine use	3.25	5.27	.62,
N	49	3	.44
Lifetime use of other illegal drugs	42.22	68.65	.31,
N	97	13	.58
Use of other illegal drugs past 30 days	7.93	5.41	.22,
N	53	6	.64
Lifetime use of inhalants	14.06	107.56	5.04,
N	70	8	.03
Past 30 days inhalant use	2.87	3.06	.01,
N	17	4	.93

Appendix M: Unweighted Odds Ratios Research Question 3 Wave 3

	No change	Sex	Age	Education
Ever smoked	.58* (.35-.95)	1.17 (.88-1.57)	1.09* (1.00-1.18)	.87** (.81-.94)
Smoked regularly	1.11 (.69-1.79)	.93 (.67-1.29)	1.01 (.92-1.11)	.78** (.71-.85)
Smoked past 30 days	.77 (.46-1.30)	1.13 (.81-1.57)	.98 (.89-1.08)	.75** (.68-.82)
Drink >2-3 times since Wave 1?	.61 (.36-1.04)	1.39* (1.02-1.88)	1.01 (.93-1.10)	1.13** (1.04-1.23)
Used marijuana since Wave 1?	.91 (.63-1.31)	1.54** (1.21-1.95)	.96 (.90-1.03)	.97 (.91-1.03)
Used marijuana past year	.79 (.43-1.44)	1.45* (.99-2.13)	.86** (.76-.96)	.92 (.84-1.01)
Used cocaine since Wave 1	1.22 (.68-2.20)	1.02 (.71-1.45)	.97 (.88-1.08)	.91 (.83-1.01)
Used cocaine past year	1.33 (.43-4.16)	1.11 (.55-2.25)	.84 (.67-1.04)	1.25* (1.04-1.49)
Used meth since Wave 1?	1.16 (.60-2.23)	1.11 (.75-1.65)	1.01 (.90-1.12)	.86** (.77-.97)
Used meth past year	.64 (.17-2.39)	1.34 (.60-2.99)	.85 (.66-1.10)	.81 (.64-1.03)
Used other illegal drugs since Wave 1	1.08 (.67-1.72)	1.27 (.94-1.71)	.96 (.89-1.05)	.97 (.89-1.05)
Used other illegal drugs past year	1.23 (.52-2.90)	1.01 (.58-1.75)	-.97 (.82-1.15)	1.00 (.87-1.15)

*p<.05

**p<.01

Appendix N: Unweighted Means Research Question 3 Wave 3

	Changed	No change	F, Sig
# days smoked	25.43	24.53	.46,
N	362	52	.50
# smoked per day	11.76	11.00	.24,
N	361	52	.62
# drinks do you usually each time?	4.36	4.28	.05,
N	728	110	.82
Past 30 days, times used marijuana	13.00	18.50	.79,
N	369	55	.37
Past 30 days, times used cocaine	1.53	1.04	.19,
N	80	8	.66
Use of other illegal drugs past 30 days	2.12	2.91	.31,
N	112	13	.58
Past 30 days times used meth	4.00	2.47	.33,
N	33	4	.57