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Brief online interventions targeting risk and protective factors for increased  
and problematic alcohol use among American college students studying abroad

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**Abstract**

Brief online interventions targeting risk and protective factors for increased and problematic alcohol use among American college students studying abroad

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Research documents increased and problematic alcohol use during study abroad experiences for college students. In addition, study abroad students may be a self-selecting subgroup of students who drink at greater rates and experience more consequences than non-study abroad students both prior to and after trips. Despite increasing numbers of students studying abroad each year and growing concerns about this high-risk event, there is limited research available documenting efficacious preventive programs with these students. Previous work suggests perceptions of study abroad peer drinking and host country native adult drinking are risk factors for increased alcohol use while abroad, while components related to positive Sojourner Adjustment (i.e., the process of positive and healthy adjustment among individuals establishing temporary residencies in new cultures) may protect against problematic use. Employing a 2 x 2 longitudinal randomized intervention design with an assessment only control condition, the present study sought to prevent increased and problematic alcohol use by correcting misperceptions of study abroad student and host country native drinking norms and by promoting positive and healthy adjustment into the host culture through brief online personalized feedback interventions. A sample of 343 study abroad students were randomly assigned to one of four conditions including a personalized normative feedback intervention (PNF) only, a Sojourner Adjustment feedback intervention (SAF), a combined PNF + SAF intervention, and an assessment only control condition. Multilevel regression analyses revealed that, contrary to hypotheses, participants in the SAF intervention condition increased their drinking during the first month abroad compared to control. This effect was mediated by decreases in perceived abstinence rates. In contrast, SAF and PNF participants reported reduced alcohol-related consequences compared to control participants during the last month abroad. Participants who studied in Europe and who reported higher pre-departure social reasons for drinking appeared to benefit most from the PNF intervention during the last month abroad. The interventions including SAF content appeared to work best for participants with higher coping reasons for drinking. This research represents an important first step in designing and implementing efficacious interventions with at-risk study abroad college students using online methodologies with normative information and Sojourner Adjustment content.

## TABLE OF CONTENTS

	Page
List of Figures	ii
List of Tables	iii
Introduction	1
Alcohol Risk among Young Adults in Transition to New Environments	1
American Students Studying Abroad	2
Drinking and Related Consequences among American Students Abroad	3
Theoretical Background	6
Social Influences on Drinking Behavior Abroad	8
Adjustment/transition to Life in a Foreign Environment – Sojourner Adjustment	12
Targeting both Misperceptions of Drinking Abroad and Sojourner Adjustment	19
Theory Revisited	20
Intervention Design	21
The Present Study	22
Method	27
Participants	27
Procedures	29
Measures	31
Interventions Conditions	38
Results	47
Analytic Plan	47
Preliminary Analyses	48
Post-feedback Questionnaire	49
Aim 1: Pilot Testing of Online Personalized Feedback Pre-departure Interventions	50
Aim 2: Evaluation of Mediators and Moderators of Intervention Efficacy	53
Discussion	76
Limitations	85
Future Directions	90
References	92
Figures	112
Tables	128
Appendix I: Measures	130
Appendix II: Sample Personalized Normative Feedback (PNF)	133
Appendix III: Sample Sojourner Adjustment Feedback (SAF)	135

## LIST OF FIGURES

Figure Number	Page
1. Changes in estimated mean drinking over time by condition	112
2. Changes in estimated mean alcohol-related consequences over time by condition	113
3. Consequences: Cultural understanding and participation by SAF and PNF interactions	114
4. Consequences: Language development and use by PNF interaction	115
5. Consequences: Social interaction with co-nationals by SAF and PNF interactions	116
6. Consequences: Homesickness/feeling out of place by SAF interaction	117
7. Consequences: Region of study moderator.	118
8. Consequences: Social reasons for drinking moderator; PNF versus control.	119
9. Consequences: Social reasons for drinking moderator; SAF versus control.	120
10. Consequences: Social reasons for drinking moderator; PNF + SAF versus control	121
11. Consequences: Coping reasons for drinking moderator; SAF versus control	122
12. Consequences: Coping reasons for drinking moderator; PNF + SAF versus control	123
13. Consequences Closeness to study abroad peer moderator;PNF + SAF versus control	124
14. Consequences: Closeness to study abroad peer moderator; PNF versus control	125
15. Consequences: Closeness to study abroad peer moderator; PNF + SAF versus control	126
16. Consequences: Closeness to study abroad peer moderator; SAF versus control.	127

## LIST OF TABLES

Table Number	Page
1. Multilevel regression analyses for drinks per week	128
2. Multilevel regression longitudinal analyses for alcohol-related consequences	129

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## **Introduction**

### **Alcohol Risk among Young Adults in Transition to New Environments**

Alcohol use and abuse is a major health concern among adults at both the national and worldwide level, with a projected 18 million adult Americans suffering from alcohol dependence or alcohol abuse (Grant et al., 2006) and an estimated 76 million individuals struggling with some form of alcohol use disorder worldwide (World Health Organization [WHO], 2004).

Research suggests alcohol may be an even bigger issue among American adults living in foreign environments. For example, the prevalence rate of heavy drinking (defined as five drinks on a typical occasion at least once per week in the past month) among active duty military personnel was 19% in 2005; a 4% increase from 1998 (Bray & Hourani, 2007). Prevalence rates of heavy alcohol use are similar for foreign aid workers and other expatriates (Cardozo & Salama, 2002; Zuckerman, 2001) and compared to the U.S. population at home, the prevalence of heavy drinking is greater among these groups (Office of Applied Studies, 2008). Young adults within these groups may be at even greater risk; not only because individuals between ages of 18-25 in the U.S. demonstrate higher rates of alcohol use than the general adult population (National Institute of Alcohol Abuse and Alcoholism [NIAAA], 2006; White, Labouvie, & Papadaratsakis, 2005), but also because the drinking behavior of young adults within some of these groups abroad is heavier and more problematic (Bray et al., 2006).

An increasing number of American young adults are establishing temporary residencies in foreign countries; notably groups such as international students (i.e., American students studying abroad), sojourners/travelers, foreign aid workers (e.g., Peace Corps), organizational and self-initiated expatriates, and military personnel (Association of Americans Resident Overseas, 2011; Department of Defense, 2011). Despite the nearly 6 million Americans living

abroad in foreign environments, limited research has addressed how situation-specific factors relevant to living in a foreign environment may contribute to the development of risky behaviors such as alcohol use. Pervasiveness of use and increasing trends among young adults abroad suggest that a continued examination of the factors associated with drinking while abroad is warranted. However despite speculations that factors such as pressure from peers, stress/coping, negative affect related to distance from home, and boredom may associate with use (Gamble, Lovell, Lankester, & Keystone, 2001), the correlates of heavy alcohol use abroad have not been adequately explored (Bray & Hourani, 2007). An understanding of the unique and general risks presented among individuals abroad can help inform prevention and intervention programs. Such programs can target the increased and problematic patterns of use that negatively influence lives abroad and upon return home to the U.S.

### **American Students Studying Abroad**

American students studying in foreign countries are one of the groups at-risk for drinking and resulting consequences abroad. American college students studying abroad are a growing and diverse population of young adults necessitating intervention for alcohol risk while abroad. The vast majority of institutions of higher education in the United States (U.S.) offer study abroad programs for students (Whalen, 2008). Students temporarily attend classes in a foreign country at a satellite (U.S. university with a campus abroad) or foreign institution while earning credit at their home institution. More than ¼ million U.S. college students studied abroad during the 2008-2009 academic year and the number of study abroad students has more than doubled over the past decade (International Institute of Education [IIE], 2011). This number is likely to increase considerably; with a projected goal of 1 million American students studying abroad by 2016-2017 (Commission on the Abraham Lincoln Study Abroad Fellowship Program, 2005;

Senator Paul Simon Study Abroad Foundation Act, 2009). Increasing numbers of ethnic minority students attend study abroad programs each year (IIE, 2011). Research with American study abroad students suggests programs can enhance a student's worldview, expand their global perspective, increase cross-cultural skills, and boost confidence and self-esteem (Carlson & Widman, 1988; Kauffmann & Kuh, 1984; Kitsantas, 2004; Kitsantas & Meyers, 2002; McCabe, 1994; Pitts, 2009). Programs can help students develop a sense of connectedness to global issues and a curiosity about different cultures that may deepen respect and appreciation for people in other culture (Craig, 1998; Lewin, 2009). Even those completing short-term programs and students with minimal international experience or knowledge show increased international understanding and cross-cultural competency after study abroad trips (McKeown, 2009). Thus, studying abroad is becoming an increasingly popular experience for many students; during which cultural, developmental, and personal growth can occur.

### **Drinking and Related Consequences among American Students Abroad**

Unfortunately, American study abroad students have been the focus of recent concerning research and media attention. Reports from study abroad experts and student affairs personnel detail problematic drinking among this population; suggesting that alcohol abuse during study abroad trips is a serious concern that needs to be addressed (Epstein, 2005; Epstein & Rhodes, 2000; Forum on Education Abroad, 2008). News reports highlight concerns that heavy drinking while abroad can lead to violence, arrest, sexual assault, and promote negative stereotypes of Americans by local people (Poggioli, 2008; Vogt, 2009; Winter, 2004). A recent survey of personnel from over 130 study abroad programs ranking alcohol and substance use second only to student mental health issues as the programs' top health and safety concern for students

(Forum on Education Abroad, 2008). Alcohol and substance abuse was ranked more concerning than pandemics, terrorism, crime, and access to appropriate medical care.

In reaction to these reports, Pedersen and colleagues (2010b) designed a longitudinal study to empirically validate the concerns about drinking abroad. Researchers found that American students more than doubled their weekly consumption levels while abroad. While drinking was significantly reduced for many students upon return home, those students who drank the heaviest while abroad returned home to the U.S. drinking at higher levels than when they left. Several factors related to observed drinking increases, including where a student chose to study and age at predeparture. Perhaps due to students' perceived normative acceptability of drinking within certain countries, students studying abroad in Europe (e.g., Spain, France, Italy, Ireland) and countries contained within the Oceania world region (i.e., Australia and New Zealand) experienced the greatest increases in drinking while abroad. Concerning age, students who were under the legal drinking age in the U.S. increased their drinking while abroad to a greater extent than students 21 or older at predeparture. Students under 21 traveled to countries where they were legally able to drink; suggesting that greater access to alcohol may associate with increased risk. Thus, students traveling to Europe and Oceania and those students under 21 at predeparture may be at the greatest risk for increased drinking while abroad.

Increased drinking is not the only concern facing American students abroad. In one study with study abroad students, researchers found that within only a one-month time frame, about one-fifth reported drinking on nights they had not planned to drink (27% of men and 23% of women), one-fifth reported taking foolish risks when drinking (27% of men and 22% of women), between one-fifth and one-third reported embarrassing themselves (33% of men and 19% of women), and over one-tenth reported noticing changes in their tolerance level (13% of men and

12% of women), (Hummer, Pedersen, Mirza, & LaBrie, 2010). Nearly one-third of the men and over one-fourth of the women in the sample reported that alcohol use resulted in sexual situations they later regretted and 16% of men and 9% of women reported not being able to remember large stretches of time when drinking (i.e., blacking out). A different sample of nearly 200 study abroad students revealed concerning rates of consequences over approximately a three-month period. In this sample, 25% of students reported alcohol induced blackouts, 15% reported drinking to the point of passing out, 15% missed a class due to drinking, 14% felt guilty or badly about themselves due to their drinking behavior, 11% found themselves in a dangerous situation they would not have been in if sober, and 9% reporting alcohol-related injuries (Pedersen, Neighbors, Lee, & Larimer, 2011d). Half of the sample drank enough on at least occasion to have a hangover the next day.

The risk for increased and problematic drinking appears to be present even before students leave for study abroad trips. Students with intentions of completing study abroad programs during college drank at higher levels and evidenced more hazardous drinking patterns (as indicated by the Alcohol Use Disorders Identification Test [AUDIT], Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), than those students with no intention to study abroad during college (Pedersen, LaBrie, Hummer, Larimer, & Lee, 2010a). Additionally, those study abroad students who intend to drink at higher levels while abroad increased their drinking to a much greater extent than those with minimal drinking intentions while abroad (Pedersen, LaBrie, & Hummer, 2009; Pedersen et al., 2010b). Additionally, students with expectations that alcohol would be readily available and make the study abroad trip more fun experienced greater numbers of general and sexual consequences while abroad (Hummer et al., 2010). While heavier drinkers abroad and those with higher pre-abroad drinking intentions appear to be at even greater risk,

lighter drinkers may also experience profound and lasting increases in their alcohol use while abroad. Research suggests college students who generally drink lightly or not at all may drink heavily during particular high-risk events (e.g., spring break trips; 21<sup>st</sup> birthday celebrations); placing these inexperienced drinkers at greater risk for consequences (Lee, Lewis, & Neighbors, 2010; Lewis, Lindgren, Fossos, Neighbors, & Oster-Aaland, 2009; Rutledge, Park, & Sher, 2008). Predisposition to heavy drinking prior to departure, predeparture expectations and pro-drinking attitudes and intentions, and risk for both heavier and inexperienced drinkers make prevention approaches an important and necessary intervening step with this population.

### **Theoretical Background**

Prevention approaches with study abroad students can be informed by theoretical models of risk and supported by empirical data. The Theory of Interpersonal Behavior (Triandis, 1977; 1980) can be applied as a framework to understand study abroad drinking. The theory expands on the Theory of Planned Behavior (Ajzen, 1985) and argues that while intentions are a driving force predicting future behavior, individuals are also influenced by previous behavior/habits and situation-specific variables present in the social and physical environment. Researchers examining young adults' behavior during spring break trips and Mardi Gras events in New Orleans utilize this theory to understand why individuals engage in risky sexual behavior (e.g., alcohol use, casual and unprotected sex) during brief trips to new environments (Maticka-Tyndale, Herold, & Mewhinney, 1998; Sonmez et al., 2006). A "situational disinhibition" may occur and individuals may act in ways inconsistent with their personalities (Maticka-Tyndale, Herold, & Oppermann, 2003). Individuals may believe that behavior is free from consequences or reprimand; similar to the "What happens in Vegas, stays in Vegas" attitude. For study abroad students, intentions to drink alcohol while abroad may combine with predeparture drinking levels

(i.e., previous drinking habits) and with environmental influences (e.g., actual and perceived behavior of peers, affect, physical isolation from familiar family and friends) to increase risk for drinking while abroad. Triandis (1980) also proposed that the influence of prior experience with a behavior is strongest when the behavior occurred frequently. Given the extent and pervasiveness of college drinking in the home environment (i.e., 85% of college students drink alcohol; Johnston, O'Malley, Bachman, & Schulenberg, 2009), the propensity for prior drinking habits to influence current behavior is present while abroad.

While the Theory of Interpersonal Behavior seeks to help understand why established drinkers may be at risk for increased and problematic use abroad, Social Learning Theory (Bandura, 1977) suggests that individuals learn behavior from observing peers; particularly within new environments where one may not know how to behave (Abselson, 1981). Thus, lighter drinkers may observe the behavior of their heavy drinking peers and establish heavier drinking patterns while abroad. This may help explain why generally lighter drinkers engage in increased drinking behavior during specific high-risk events (Lee et al., 2009; Lewis et al., 2009; Rutledge et al., 2008). Students are unaware of the appropriate behavior in these novel environments and seek observable information from the surroundings. Unfortunately, observations may consist of established drinkers engaging in risky behavior. Compounding these risks is the potential for both lighter and heavier drinking individuals to be influenced by not only overt behavior, but also by one's perceptions of behavior within the environment; and perceived peer drinking behavior is nearly always overestimated to be heavier than it is in reality (Borsari & Carey, 2003; Perkins, 2003).

Both the Theory of Interpersonal Behavior and Social Learning Theory provide a conceptual framework to inform preventive drinking interventions with college students studying

abroad. Using empirical findings supporting these ideas, we targeted two major contextual aspects of increased risk abroad – social influences on drinking behavior abroad and adjustment/transition to life in a foreign environment. As reviewed below, research on social influences on drinking behavior suggests normative misperceptions of peer drinking behavior can have a strong connection to drinking while abroad. Conversely, research on adjustment to life abroad, or Sojourner Adjustment (Church 1982), suggests that engagement and participation in the cultural environment may protect individuals from problematic drinking.

### **Social Influences on Drinking Behavior Abroad**

For young adults, the desire to fit in and initiate and maintain friendships among peers is a major motivating force behind general behavior (Arnett, 2004; Festinger, 1954) and drinking behavior in particular (Cooper, 1994; LaBrie, Hummer, & Pedersen, 2007). Direct pressure from peers to drink alcohol is normative in college settings and these offers to drink alcohol associate with increased and problematic drinking during college (Baer, 2002; Borsari & Carey, 2001; Wood, Read, Palfai, Stevenson, 2001). In addition, students may be motivated to consume alcohol in order to initiate new friendships and relationships with peers; an effect possibly enhanced by one's desire to connect quickly with peers within the brief duration of the study abroad trip (i.e., about one to three months for the majority of students; IIE, 2011). Study abroad students with higher reported social reasons for drinking while abroad (e.g., “because it makes social gatherings more fun,” “to be sociable”) demonstrated heavier drinking behavior while abroad (Pedersen et al. 2011d). Direct offers to drink alcohol may combine with the desire for peer connection to exacerbate risk while abroad.

In addition to direct pressure from peers, indirect pressure manifested through perceived normative drinking behavior of peers has emerged in the research literature as a major factor

predicting one's own alcohol use (Borsari & Carey, 2003; Neighbors, Lee, Lewis, Fossos, & Larimer, 2006). Social Norms Theory (Perkins, 2002; Perkins & Berkowitz, 1986) proposes that individuals are influenced to engage in risky behavior (e.g., heavy drinking) due to their perceptions of the behaviors (perceived descriptive drinking norms) and attitudes (perceived injunctive drinking norms) of their salient peer referents. These perceptions are nearly always large overestimations of behavior and they can exert a considerable amount of influence over an individual's behavior and attitudes. Misperceptions and their influence are present for lighter, moderate, and heavier drinkers (Prentice & Miller, 1996; Ross, Greene, & House, 1977; Suls & Wan, 1987), making applications of Social Norms Theory during interventions an acceptable approach with all levels of drinkers.

**Misperceptions of peer alcohol use.** While it is well documented that individuals greatly overestimate the alcohol use of their peers in the general college environment, students also misperceive the behavior of peers within smaller specific subgroups, such as athletes; Greek students; close friends; and class year-specific peers (Dams-O'Connor, Martin, & Martens, 2007; LaBrie, Hummer, Neighbors, & Pedersen, 2008b; Lewis & Neighbors, 2007; Martens, Dams-O'Connor, Duffy-Paiement, & Gibson, 2006; Suls & Green, 2003). Theories (Social Comparison Theory; Festinger, 1954; Social Impact Theory, Latane, 1981) and research (Borsari & Carey, 2003; Lewis, Neighbors, Oster-Aaland, Kirkeby, & Larimer, 2007) suggest that misperceptions of these proximal peer groups can exert more influence on drinking behavior than more distal groups. This is perhaps due to the stronger connection (closeness) one feels towards their salient groups. Research with student athletes found that the relationship between perceived descriptive drinking norms and alcohol use was moderated by closeness to team members; that is, those who felt closer to their teammates and had higher perceived drinking norms of athletes displayed the

heaviest drinking behavior (Grossbard, LaBrie, Hummer, Pedersen, & Neighbors, 2009). Examining perceived injunctive norms (attitudes towards drinking), Reed and colleagues (2007) found that greater connection to friends, peers, and fraternity/sorority members combined with higher perceived injunctive norms to predict drinking behavior. Thus, closeness to the reference group may be an influential factor contributing to the established relationship between perceived norms and behavior.

**Study abroad-specific misperceptions.** Study abroad students have the potential to connect with both American study abroad peers and host nationals inside the host country and perceived drinking norms of both groups have the potential to influence behavior. Within the study abroad environment, perceived norms of general and country-specific study abroad peer drinking predicted increased drinking while abroad (Pedersen et al., 2009; 2010b). Students with higher perceived norms of peer drinking within the study abroad environment experienced the greatest increases in drinking while abroad. This effect was evident for perceptions of both general study abroad students and students that were studying abroad within the individual's host country. In addition to American peer behavior, study abroad students may also be influenced to drink alcohol while abroad based on their perceptions of the normative drinking within their host country. American students' perceived drinking norms of native young adults in one's host country predicted drinking for students while abroad (Pedersen, Cruz, LaBrie, & Hummer, 2011a).

**Personalized normative feedback interventions.** Correcting one's misperceptions of peer drinking norms has become one of the prominent strategies for addressing excessive alcohol use among adolescents (O'Leary-Tevyaw & Monti, 2004), college students (Larimer & Cronce, 2007; Walters & Neighbors, 2005; White 2006), non-college young adults (Doumas & Hannah,

2008), and working adults (Hester, Squires, & Delaney, 2005; Riper et al., 2009; Walters & Woodall, 2003). Reductions in misperceptions have been shown to be a mediator of reduced drinking observed after these personalized normative feedback interventions (Borsari & Carey, 2000; Neighbors, Lee, Lewis, Fossos, & Walter, 2009) demonstrating the power of correcting normative perceptions in reducing drinking. Interventions targeting group-specific misperceptions of behavior have also been shown to effectively reduce perceived norms and drinking behavior (LaBrie, Hummer, Huchting, & Neighbors, 2008a; LaBrie et al., 2008b; Lewis & Neighbors, 2007). While most of this research has focused on reducing already established drinking patterns, recent work documents successful interventions targeted toward preventing drinking during specific high-risk events (Neighbors et al., 2009). Challenging study abroad students' predeparture overestimations of salient and proximal reference groups (i.e., study abroad peers; native country-specific adults) by providing them with accurate normative information may help students form a more accurate belief about drinking within their host country. Thus, correcting these misperceptions during preventive personalized normative feedback (PNF) interventions may help prevent increased and problematic drinking while abroad.

Additionally, incorporating intentions to drink while abroad into PNF interventions may contribute to reductions in drinking and consequences. In addition to having a major role in the Theory of Interpersonal Behavior, intentions to drink alcohol are a major contributor to drinking behavior while abroad (Pedersen et al. 2009, Pedersen et al., 2010b). In an event-specific PNF intervention targeting 21<sup>st</sup> birthday drinking, Neighbors and colleagues (2009) included a component to the PNF that focused on comparing one's drinking intentions with perceived and actual norms of other college students' drinking behavior. These researchers found that those

who intended to reach higher blood alcohol levels on their birthday benefited most from the intervention. Thus, including intentions to drink during high-risk event may be an important component of preventive norm-focused interventions.

### **Adjustment/transition to Life in a Foreign Environment -- Sojourner Adjustment**

Despite increased risks in general, not all study abroad students engage in risky drinking behavior or experience consequences. Taking advantage of cultural learning experiences (e.g., participating in local customs and traditions, spending time with local people) rather than focusing on drinking-centered social experiences (e.g., partying, spending most of time with Americans) may have a protective function against heavy drinking and resulting problems. Furthermore, if study abroad students experience healthy psychological and sociocultural adjustment to life in the new environment, they may seek more opportunities to engage their new culture and limit their time spent drinking. Indeed, research with the theoretical concept of “acculturation” suggests that immigrants who attempt to integrate (i.e., strive to both maintain their home culture and increase intergroup relations) or assimilate (i.e., place more emphasis on connecting with the host culture) are at the least risk for sociocultural and psychological adjustment difficulties (Berry 1997; 2003; Ward & Rana-Deuba, 1999). For many immigrant groups, increased acculturation can be a protective factor against heavy and problematic drinking (Chun, Balls Organista, & Marin, 2003; Zenmore, 2007). The concept of acculturation however, which is typically applied to immigrants establishing long-term residences in foreign environments, may not translate to study abroad students who are living abroad for a limited period of time. Thus new research has emerged targeting the process of positive and healthy adjustment among individuals establishing temporary residencies in new cultures. This concept is referred to as “Sojourner Adjustment.”

Sojourner Adjustment, defined by Church (1982) as “the psychological adjustment of relatively short-term visitors to new cultures where permanent settlement is not the purpose of the sojourn” (p. 540), may be applied within the population of study abroad students to protect against alcohol risk. Similar to the acculturation literature which targets long-term residents in foreign countries, international students who make attempts to engage their new culture are at the least risk for psychological and sociocultural adjustment difficulties during programs abroad (Berry, 1998; Ward & Kennedy, 1994; Ward & Rana-Deuba, 2000; Searle & Ward, 1990). Specifically for American study abroad students, separation from the host environment (i.e., placing more emphasis on the home/U.S. culture) predicted drinking for students during trips (Pedersen et al., 2011a). Hummer and colleagues (2010) also found that perceived cultural differences and anxiety about interacting in the foreign environment predicted greater alcohol-related consequences for students abroad. Reviews of the limited qualitative research with American study abroad students reveal that Sojourner Adjustment may ease the difficulties of adjusting to life in a new culture and associate with reduced risk for negative experiences abroad (Carlson, Burn, Useem, & Yachimowicz, 1990; Kauffmann, Martin, Weaver, & Weaver, 1992; Pitts, 2009; Thomlinson, 1991).

In an effort to operationalize the Sojourner Adjustment concept into multiple measurable behavioral components, Pedersen and colleagues (2011c) designed the Sojourner Adjustment Measure (SAM). The SAM contains four aspects of positive Sojourner Adjustment ([1] social interaction with host nationals, [2] cultural understanding and participation, [3] language development and use, [4] host culture identification) and two negative Sojourner Adjustment factors ([5] social interaction with co-nationals, [6] homesickness/feeling out of place). An

understanding of how these Sojourner Adjustment factors can contribute to or protect students from problematic drinking can assist in the development of preventive interventions.

**Social interaction with host nationals.** It has long been agreed that quantity of interactions with host country nationals is necessary for positive Sojourner Adjustment (Brien & David, 1971; Chapdelaine & Alexitch, 2004; Klineberg & Hull, 1979). Church (1982) states that interaction with host nationals may be the most essential component of adjustment while abroad and both quantity (Ward & Kennedy, 1993a) and quality (Stone Feinstein & Ward, 1999; Ward & Rana-Deuba, 2000) of interpersonal contact is found to contribute to positive psychological adjustment. Unsatisfying relations with host nationals associates with reduced sociocultural adjustment for foreign students (Ward & Kennedy, 1993b). While American study abroad students reported more desire for contact with host nationals than they actually achieved while abroad (Pitts, 2009), those who made active attempts to socialize and connect with host nationals (e.g., by living with a host family, by going out and meeting local people) reported greater immersion into the culture (Monalco, 2002). Regarding protection from drinking risk, increased interaction with local people has been documented to predict fewer alcohol- related problems for American study abroad students (Pedersen et al., 2011d). Less social interaction with local people predicted more problems resulting from alcohol use. Increased contact with local people may lead to less experience with alcohol consequences due to less time available to spend with American peers in drinking settings (e.g., bars, clubs). In addition, striving toward cultural understanding by connecting with local people may help students feel more connected to the environment, as less connection to the novel setting may exacerbate risk for deviant behavior (Redmon, 2002; 2003b).

**Cultural understanding and participation.** Cultural understanding and participation refers to the degree of active attempts to appreciate and engage oneself in the cultural experience while abroad. For American study abroad students, greater interaction with the foreign environment is suggested to associate with enhanced development and personal growth (Kauffmann et al., 1992). Goals of enhanced cultural competency prior to departure associate with increased global understanding and cross-cultural skill development after study abroad trips (Kitsantas, 2004). Surprisingly, researchers found this factor to be predictive of increased rates of alcohol-related consequences abroad after controlling for the other three positive Sojourner Adjustment factors (Pedersen et al., 2011d). Nevertheless, cultural understanding has still been retained as a positive factor of Sojourner Adjustment. Positive correlational relationships exist between this Sojourner Adjustment factor and other positive Sojourner Adjustment factors and negative correlations between cultural understanding and participation and hypothesized negative Sojourner Adjustment factors using the SAM have been established (Pedersen et al., 2011c). Perhaps participation is inevitable for many students abroad even with more passive attempts at adjusting abroad. For example, students may learn much about the culture and be required to attend cultural events through coursework while abroad, however, they may not actively engage the culture in a manner that is protective from heavy drinking and resulting consequences. This idea can be examined in future empirical work with students.

**Language development and use.** This factor refers to one's active attempts to learn the local language (or dialect/idioms in countries where the language is the individual's native language) and one's use of the local language during interactions with others. Kim (1977; 2001) and Berry (2003) maintain that language acquisition is an essential component of the cultural adjustment process. Poor language proficiency predicted social difficulty and reduced

sociocultural adjustment among foreign students (Ward & Kennedy, 1993b) and barriers to communication with local people are suggested to predict adjustment difficulty (Church, 1982; Dillion, 1993; Heikinheimo & Shute, 1986). For American study abroad students, the language development and use factor of the SAM had the strongest unique effect on prediction of fewer alcohol-related consequences while abroad (Pedersen et al., 2011d). Moreover, study abroad students in this same sample who reported drinking for more social facilitation reasons who also reported difficulties with language development and use experienced greater numbers of alcohol-related consequences abroad.

**Host culture identification.** Host culture identification refers to one's immersion into the culture; similar to Berry's assimilation acculturation style of engaging the new culture while letting go of many aspects of the home culture. Confusions about cultural identity are suggested to associate with difficulties in adjustment abroad (Mumford, 1998), while identification with the host culture may lead to increased interest in international affairs (Nash, 1976). In addition, research with foreign study abroad students suggests that cultural identity may be an important predictor of sociocultural adjustment (Ward & Kennedy, 1993a; Ward & Searle, 1991). Assimilation into the host culture is a major protective factor against immigrant and Sojourner Adjustment difficulty while separation of the home and host cultures may lead to increased risk for difficulty and risky drinking behavior (Berry, 1997; 2003; Ward & Rana-Deuba, 1999). Identification with the host culture (e.g., behaving in ways that are typical of host nationals, adopting cultural practices and beliefs) trended toward significance ( $p = .08$ ) in predicting reduced risk for alcohol-related problems among American students abroad (Pedersen et al., 2011d). Additionally in this sample, the greatest risk for consequences was evident among students who drank for coping reasons (e.g., "to forget your worries") who also reported limited

host culture identification. Perhaps study abroad students who experience a great degree of differentiation between their home and host culture may develop heavier drinking patterns to cope with feeling separated from the culture. This differentiation may be marked by feeling of exclusion from the culture, unexpected cultural differences, loss of familiarity, and self-identity confusion (Taft, 1977).

**Social interaction with co-nationals.** Specific to American study abroad students, this component relates to the quantity (e.g., time spent with peers) and quality (e.g., developing strong relationships/friendships) of interactions with other American peers within the host country. Research is mixed on the impact of positive relations with co-nationals on Sojourner Adjustment. Some studies suggest that social support from both home peers (co-nationals) and host country nationals is helpful for adjustment (Berry et al., 1997; Furham & Alibhai, 1985; Ward & Kennedy, 1993a; Ward & Rana-Deuba, 2000). Other research suggests that interaction with co-nationals may hinder the development of relationships with host country nationals and associate with negative Sojourner Adjustment. For example, qualitative research with American study abroad students has found that despite components most likely related to Sojourner Adjustment (i.e., living with a host family, attending a foreign university with a language development focus), students living abroad reported spending the majority of their time with co-nationals and described the feeling of being a tourist in the host country rather than a temporary member of the culture (Citron, 1996). Students' predeparture goals of social gathering (e.g., desire to be with friends that were completing the program) failed to correlate with enhanced cultural competence during trips (Kitsantis, 2004). Thus, social interaction with co-nationals is conceptualized as a negative component of Sojourner Adjustment, related to the separation acculturation style suggested by Berry (1980; 2003). Indeed this factor also correlated with the

other negative Sojourner Adjustment factor (homesickness/feeling out of place) and with the separation acculturation dimension as assessed by a measure of Berry's four acculturation styles (Pedersen et al., 2011c). Regarding drinking risk, this component of Sojourner Adjustment predicted alcohol-related consequences while abroad even after controlling for positive Sojourner Adjustment factors. Indeed, a one unit increase on this factor on the SAM (a scale from 1 to 7) associated with a 12% increase in the rate of consequences while abroad.

**Homesickness/feeling out of place.** Difficulties with Sojourner Adjustment may manifest as depression, anxiety, homesickness, loneliness, and feeling out of place within the host environment. These negative mood experiences have been linked to reduced adjustment while abroad for international students (Klineberg & Hull, 1979; Stone-Feinstein & Ward, 1990; Ward & Rana-Deuba, 2000). Personnel working with American study abroad students propose that feelings of rejection from the host culture (e.g., wishing to escape, straining to adapt, and homesickness) may influence students' drinking behavior while abroad (Mumford, 1998; Taft, 1997). As such, homesickness/feeling out of place was predictive of increased alcohol-related consequences after controlling for positive Sojourner Adjustment factors (Pedersen et al., 2011d).

**Promoting Sojourner Adjustment goals.** Increased contact with host nationals and placing oneself in cultural experiential learning environments may reduce the frequency of opportunities to spend drinking with American peers. Activities associated with engaged participation in the culture may also serve as healthy alternatives to drinking, serving both to fill time and provide a means of achieving social and recreational goals without drinking (Murphy, Correia, & Barnett, 2007). Positive adjustment may also lead to reduced motivation to drink for coping reasons and thus relate to reductions in alcohol use and consequences. A stronger

connection to the novel environment (i.e., the study abroad country and its members) may protect against deviant behavior (Redmon, 2002; 2003b). Likewise, researchers and student affairs personnel argue that helping students understand the difficulties they may face with adjustment while abroad (i.e., “culture shock”) prior to departure may help them better adjust to life abroad and reduce risk for negative experiences (Black & Mendenhall, 1990; Brislin & Kim, 2003; Winkelman, 1994). Thus, it appears that promoting positive Sojourner Adjustment and cautioning students of negative Sojourner Adjustment through predeparture intervention may help reduce negative drinking incidents abroad.

Although predeparture orientations have the ability to promote cultural immersion goals among sojourners (e.g., Thomlinson, 1991; Wilkinson, 1998), few institutions of higher education have any established programs to assist students with the creation of goals and prevent alcohol risk while abroad. Kitsantas (2004) suggests that predeparture programs should help students establish goals of cultural understanding and social interaction with host nationals, find ways to reinforce these goals, and help students refocus social gathering goals related to spending time with co-nationals during the experience. Having students take ownership of their cultural immersion goals through personalized feedback may assist them in reaching these predeparture goals while abroad (Schunk, 2000; Zimmerman & Kitsantas, 1999). Anecdotal reports from study abroad experts and student affairs staff suggest promotion of cultural immersion goals may help reduce negative drinking incidents abroad (Epstein, 2005; Harley, 2001; Mendelson, 2008).

### **Targeting both Misperceptions of Drinking Abroad and Sojourner Adjustment**

Looking at the theoretical and empirical evidence reviewed above, targeting misperceptions of study abroad drinking behavior has the potential to prevent risky alcohol use

behavior abroad. The theoretical and empirical literature on Sojourner Adjustment suggests that engagement, participation, and temporary integration into the host culture may contribute to less difficulty while abroad and reduce incidents of alcohol-related consequences. Perceived norms and Sojourner Adjustment may also combine in interesting ways to protect against or increase risk. Using a measure of Berry's acculturation orientations, Pedersen and colleagues (2011a) found that study abroad students who separated themselves from the host environment (i.e., identified more with the home U.S. culture while abroad than with the host culture) who also perceived other study abroad students in their country to drink at high levels drank at higher levels themselves. Additionally, students with low assimilation orientation styles (i.e., those who placed less emphasis on the host culture while abroad) who also believed local people in their country drank at heavier levels consumed a higher amount of alcohol during the trip. This research suggests that the greatest risk for drinking abroad is evident among students with higher perceived drinking norms of others within the environment who also have limited engagement in the host culture abroad (lesser degree of positive Sojourner Adjustment). Thus, perhaps targeting both perceptions and Sojourner Adjustment during interventions with this group may aid in the prevention effort against heavy drinking and negative consequences.

### **Theory Revisited**

Study abroad-specific drinking behavior may be determined directly by (1) intentions to engage in the behavior and indirectly by (2) past behavior/habits, and situation/environment-specific constraints and conditions such as (3) attitudes about the environment and (4) social determinants of behavior. Utilizing the ideas expressed above within the Theory of Interpersonal Behavior model, individuals' drinking behavior while abroad is suggested to be a function of these four factors. It has been established that students intend to drink alcohol while abroad and

these intentions associate with actual behavior abroad (Pedersen et al., 2009; 2010b). Students also have past behavior/experience with drinking, as demonstrated by research indicating 85% of college students drink alcohol, and studies suggesting study abroad students may be a self-selecting group of heavier drinkers (Johnston, O'Malley, Bachman, & Schulenberg, 2009; Pedersen et al., 2010a). Those with less engagement and participation in the host culture (attitudes about the environment; Sojourner Adjustment) and who believe drinking is an important part of the study abroad experience are at increased risk for consequences while abroad (Hummer et al., 2010; Pedersen et al., 2011d). Finally, social determinants of behavior, as assessed by normative perceptions of drinking behavior of both co-nationals and host nationals within the host country, predict drinking behavior abroad (Pedersen et al., 2009; 2010a; 2011a). Thus, targeting these theoretical and empirically supported factors in predeparture interventions may help reduce risk for increased drinking and consequences for students while abroad.

### **Intervention Design**

**Online delivery.** Helping students prepare for adjustment into their new culture, while employing techniques to prevent heavy alcohol use, may assist in the promotion of healthy and positive study abroad experiences. The Internet is considered to be an important method of promoting access to health-related information for young adults (Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006) and students may prefer Internet approaches over in-person interventions (Kypri, Saunders, & Gallagher, 2003). Benefits of Internet-based intervention approaches include ease and expanded time of access, standardized intervention formats, individually tailored feedback, reduced cost and burden on campus resources, and ability to recruit a large and representative sample through email and survey link invitation (Moore, Soderquist, & Werch, 2005; Saitz et al., 2007; Stretcher, 2007; Zisserson, Palfai, & Saitz, 2007).

PNF regarding drinking norms has been successfully administered via Internet for both general and event-specific drinking and has been used to prevent intended drinking during a specific high-risk event through an intervention completed solely online (Larimer et al., 2011; Neighbors et al., 2009).

**Personalized components.** Despite general and school-specific websites available to students that offer tips for safe travel abroad, there is no known empirical examination of their efficacy in preventing heavy and problematic alcohol use abroad. In addition, the content presented is general, may not refer to country-specific relevant information, and students may be unaware of the existence of the resources available to them on these websites. Also, information may not be attended to if not personally relevant (Berkowitz, 2004) and feedback that is individually-tailored and easily accessible associates with increased interest and satisfaction with content; specifically for health and alcohol information (Lewis, 1999; Simon-Arndt, Hurtado, & Patriarca-Troyk, 2006; Vasilyeva, Puuronen, Pechenizkiy, & Rääsänen, 2007). Therefore, easy access to actual normative drinking information, and tips and skills that are personally relevant based on one's own Sojourner Adjustment goals, may be important considerations for predeparture programs. Taken together, an Internet-based approach to correct students' perceived drinking norms and promote Sojourner Adjustment goals may be an appropriate means of intervention with study abroad students.

### **The Present Study**

**Specific Aims.** The current study sought to prevent increased and problematic alcohol use among study abroad students by correcting misperceptions of study abroad student drinking norms, correcting misperceptions of country-specific native adult drinking norms, and promoting positive adjustment and engagement into the host culture during brief online personalized

feedback interventions. As students are generally excited and engaged in the study abroad experience prior to departure, a brief intervention weeks before departure may be an acceptable juncture to engage students and address general and study abroad-specific drinking risks. The specific aims of this study were as follows:

***Specific aim 1 -- Pilot testing of online personalized feedback predeparture***

***interventions.*** We developed and pilot-test online interventions to help prevent increased and problematic drinking among American students studying in foreign countries. Intervention content was prepared using campus-specific study abroad student drinking norms and country-specific native adult drinking norms obtained in prior work and from the WHO Global Status Report on Alcohol (2004), as well as a six-factor model of Sojourner Adjustment created in prior work (Pedersen et al., 2011c). We employed a 2 x 2 longitudinal randomized design with an assessment-only control condition (condition 1) to examine the efficacy of providing students with accurate descriptive drinking norms for region-specific study abroad peers and country-specific host country nationals (personalized normative feedback, PNF; condition 2); personalized Sojourner Adjustment feedback with tips, strategies, and resources to meet cultural engagement goals while abroad (Sojourner Adjustment feedback, SAF; condition 3); or a combination of norms and Sojourner Adjustment feedback (condition 4).

***Hypothesis 1a.*** Participants in all intervention conditions would experience smaller drinking increases during the study abroad trip and fewer alcohol-related consequences while abroad compared to control participants.

***Hypothesis 1b.*** Combined personalized normative feedback and Sojourner Adjustment feedback participants (condition 4) would experience smaller drinking increases during the trip and fewer alcohol consequences compared to single intervention conditions (conditions 2 and 3).

*Specific aim 2 -- Evaluation of mediators and moderators of intervention efficacy.* By including hypothesized mediators and moderator of intervention efficacy, we further examined the components that potentially influenced less risky drinking while abroad. Mediators included changes in perceived norms (reduction from predeparture perceived norms) and greater engagement in positive Sojourner Adjustment behaviors while abroad. As students traveling to European and Oceanic regions and students under the legal U.S. drinking age may be most at risk for increased drinking abroad (Hummer et al., 2010; Pedersen et al., 2010b), region of study and age (i.e., legal drinking age status) were included as moderators of intervention efficacy.

In addition, we examined exploratory variables' influence on intervention condition effects. These variable were selected based on the theoretical models seeking to explain study abroad drinking behavior and resulting consequences (Theory of Interpersonal Behavior, Social Norms Theory), research that closeness to the reference group augments the influence of perceived norms on drinking behavior (Grossbard et al., 2009; Reed et al., 2007), and research that reasons for drinking alcohol predicted drinking while abroad (social reasons, coping reasons; Pedersen et al., 2011d). Thus, two exploratory moderators assessed prior to departure were included: (1) social reasons for drinking and (2) coping reasons for drinking to determine if reasons for drinking moderated the intervention effects. Additionally, two exploratory variables assessed at the end of the study abroad trip were examined to determine if (1) closeness to region-specific study abroad peers and (2) closeness to country-specific host nationals impacted trajectories of drinking and consequences between intervention conditions. As closeness to region-specific study abroad peers and closeness to country-specific nationals were assessed at post-return (after the intervention was delivered) there were not conceptualized as moderators as

moderators are typically assessed pre-intervention. Thus, we could not conclude causality. Interactions between these exploratory variables and intervention effects were evaluated.

*Hypothesis 2a.* We hypothesized changes in perceived norms for study abroad peers and host country nationals would mediate intervention efficacy. Participants in conditions 2 and 4 who experienced greater reductions in perceived norms over time from predeparture would drink less and experience fewer consequences while abroad compared to (1) participants in the control condition and (2) participants in conditions 2 and 4 with fewer changes in perceived norms over time.

*Hypothesis 2b.* We hypothesized Sojourner Adjustment would mediate intervention efficacy. Participants in conditions 3 and 4 who reported more engagement with positive Sojourner Adjustment factors and lower reports of negative Sojourner Adjustment difficulties while abroad would drink less and experience fewer consequences while abroad compared to (1) participants in the control condition and (2) participants in conditions 3 and 4 who report less engagement in positive Sojourner Adjustment factors and more Sojourner Adjustment difficulties while abroad.

*Hypothesis 2c.* As in prior work with study abroad students (Pedersen et al., 2010b), we hypothesized drinking while abroad would vary as a function of region of study in all conditions. Those studying abroad in the heavier drinking regions (i.e., Europe and Oceania) would benefit most from intervention conditions 2, 3, and 4.

*Hypothesis 2d.* As in prior work (Pedersen et al., 2010b), drinking while abroad would vary as a function of legal drinking age status with younger students increasing their drinking to a greater extent than those 21 and older. Younger participants would benefit most from intervention conditions 2, 3, and 4.

*Hypothesis 2e.* Although included as exploratory moderators, social reasons for drinking and coping reasons for drinking were expected to moderate intervention effects. Specifically, we hypothesized those with higher social reasons for drinking would benefit most from conditions 2 and 4 (targeting normative drinking misperceptions; social influence), while those with higher coping reasons for drinking would benefit most from conditions 3 and 4 (targeting the negative Sojourner Adjustment factor of homesickness/feeling out of place).

*Hypothesis 2f.* Exploratory interaction effects of closeness to region-specific study abroad peers and closeness to country-specific host nationals were examined. It was hypothesized that those with higher reported closeness to peers and host nationals at the end of the trip would have benefitted most from intervention conditions 2 and 4 (targeting normative drinking misperceptions of salient reference groups). However, as intervention effects may have affected post-return reports of closeness, these interactions were interpreted as correlational.

## **Method**

### **Participants**

Participants were recruited through the Study Abroad Office at the University of Washington International Programs and Exchanges Global Affairs Office (UW IPE). To build on and enhance successful recruitment strategies employed successfully in prior work (Pedersen et al., 2010b); two methods were used to promote awareness of the research study opportunity. First, prospective study abroad students who completed a recommended 20-minute online orientation offered through the UW Study Abroad Office were provided a description of the research study with an opportunity to sign up for participation. A brief statement on the main page of the UW IPE website also informed students of the research opportunity accessible by completing the online orientation. Students who were interested in the study after reading this description clicked a web link to an online sign-up sheet (name, email address, phone number, preferred address for receiving the incentives for participation, specific dates of departure and return, and country location of the study abroad program). This information was used to determine eligibility of study participation. In addition, during the Spring, Summer, and Fall quarters of 2010 and during the Winter and Spring quarters of 2011, the UW Study Abroad Office sent an email to eligible study abroad students informing them of the opportunity to participate in the research study. This recruitment email, similar in content to the brief description provided after the online orientation, briefly described the study and incentive structure and ensured participants of the confidentiality of their responses.

Eligibility criteria were determined prior to the launch of the study. First, only students leaving for study abroad trips during the Spring, Summer, and Fall quarters of 2010 and during the Winter and Spring quarters of 2011 were eligible to participate. Second, only students

studying abroad for one quarter (approximately three months; the majority of UW students study abroad for this length of time) during these five quarters were eligible. Students studying between eight and 18 weeks were included. These stipulations were placed on recruitment to standardize the assessment periods across participants and intervention conditions. Third, due to the country-specific intervention content needed to be generated prior to departure abroad, students needed to be travelling to one of 30 countries predetermined by the researchers. These countries were the 30 most frequently travelled locations as reported by the UW Study Abroad Office. Lastly, students needed to be studying in one country only in order to standardize intervention formats and provide feedback regarding one country of study only. The majority of UW students complete study in just one country, with a minority splitting time abroad between multiple sites. Of the 848 students who signed up for the study, 431 (51%) met these four criteria and were invited to participate. Fifty-nine percent of the ineligible students reported studying abroad for less than one quarter (e.g., one month or less), 26% reported studying abroad for longer than one quarter (e.g., 6 months or one year), 5% reported studying in one of the 30 countries not eligible for participation (e.g., Fiji, Canada), 2% reported studying abroad in multiple countries, and 8% signed up for the study late (i.e., completed the online orientation after they had already departed abroad).

Of the 431 eligible students invited, 343 (80%) completed the pre-departure questionnaire and were randomly assigned to an intervention condition. Participants reported a mean age of 21.14 ( $SD = 3.11$ ) with 1% reporting first year status, 15% reporting sophomore status, 38% reporting junior status, 43% reporting senior status, and 3% reporting graduate student status. Participants were primarily female (78%) and of Caucasian/White ethnicity (72%). Other ethnicities included 14% identifying as Asian/Pacific Islander, 7% as “mixed ethnicity,” 2% as

Hispanic/Latino(a), 2% as African-American/Black, and 3% Native American/Alaskan Native or “other ethnicities.” These demographics were similar to the gender and ethnic make-up of students studying abroad from the UW and national statistics (IIE, 2011), however; more men study abroad at the national level (36% in 2008/2009). The present sample contained more ethnic minorities than at the national level (national data reports 81% White/Caucasian).

UW students generally travel to five world regions: Europe (e.g., Ireland, France), Asia (e.g., China, Japan), Oceania (e.g., Australia, New Zealand), Latin America (e.g., Mexico, Brazil), and non-traditional study abroad locations encompassing countries in the Middle East, Africa, South Asia, and West Asia (e.g., South Africa, India, Israel). Seventy-four percent of participants studied abroad in Europe, 5% studied in Asia, 5% studied in Oceania, 8% studied in Latin America, and 9% studied in non-traditional regions. The top three countries represented in the sample were Italy (29% of sample), Spain (13%), and the Greece (8%). Participants studied abroad for a mean of 11.15 weeks ( $SD = 2.50$ ).

## **Procedures**

Two weeks before their departure abroad, eligible students who completed the online sign-up sheet and indicated interest in participating in the study were emailed a link to an online confidential survey. After reading and indicating consent on an online information statement, participants completed a 15-to-20 minute online survey of demographics, baseline drinking, intended drinking, alcohol-related consequences, perceived drinking norms, reasons for drinking, closeness with peers, and Sojourner Adjustment goals while abroad. Once completed, participants were electronically randomized to one of the four conditions using blocked randomization to promote equal cell sizes. Participants were randomized to conditions based on their responses to the questions about current drinking behavior to minimize potential baseline

differences in drinking behavior between conditions. If randomized to one of the three intervention conditions, participants immediately received feedback based on their responses. Control participants exited the survey. During the first week of their trip, participants in the three intervention conditions were re-sent their personalized feedback by email. The feedback was identical to the feedback participants initially received after completing the pre-departure questionnaire. The purpose for re-sending this feedback was to remind students about the feedback, allow them easy access to the feedback through their email, and to give them an additional chance to review it once they were settled into their new foreign environment. Control participants did not receive any feedback during the first week abroad.

Participants received emails containing links to online surveys during their first month abroad (approximately four weeks into the trip), their last month abroad (approximately one week prior to their return date to the U.S.), and during a week in the middle of these periods (i.e., most participants were sent a survey during their eighth or tenth week abroad; those who were abroad for 18 weeks, for example, received the “middle follow-up” survey during week 12). As some participants studied abroad for less than three months, they did not receive the middle follow-up survey. Those students who studied between 8 and 11 weeks only received the first month abroad and last month abroad surveys. Each of these emails contained a link to complete a brief online survey of alcohol use, alcohol-related problems, perceived norms, and Sojourner Adjustment. It was anticipated the majority of students would have adequate access to Internet. In addition to confirming this to be true based on consultation with the UW Study Abroad Office and previous study abroad students, worldwide statistics of Internet usage demonstrate that Internet is available in each of the 30 countries included in the study (Internet World Stats, 2009). The UW Study Abroad Office also confirmed the majority of universities at which UW

students study while abroad offered free access to the Internet and many students bring laptop computers (and are encouraged to do so by the UW IPE) and receive free or monthly-paid access to the web. One month after returning to the U.S., participants completed a post-return survey via emailed survey link. Completion rates of follow-up surveys were adequate. Eighty-seven percent completed the first follow-up survey, 78% of those sent the middle follow-up survey completed this survey, 75% completed the last month follow-up survey, and 83% completed the post-return survey.

Participants received a \$10 check for completion of the pre-departure survey, \$10 for each of the three monthly follow-up surveys while abroad, and \$10 for the post-return survey. Incentives were funded by research funds awarded to Eric Pedersen from the UW Alcohol and Drug Abuse Institute. Procedures for this study, including informed consent documents and email survey invitations, received UW Human Subjects approval (HS # 33835). Questionnaires and intervention feedback were hosted on DatStat Illume, a secure online data collection and management program supported by Dr. Mary Larimer's lab. Several steps were taken to ensure participants understood the voluntary and confidential nature of the study during the recruitment process and during participation. These included the use of randomized personalized identification number (PIN) codes to ensure confidentiality, the storage of data in encrypted form on a secure server accessible only by the PI and mentors, inaccessibility of participant responses or participation status by the UW Study Abroad Office, explanation of the sensitive nature of some questionnaire items, and the option to decline to participate at any stage.

## **Measures**

**Pre-departure questionnaire.** Two weeks prior to the departure date indicated on their online sign-up sheet, participants were sent a link to the pre-departure questionnaire at the email

address they provided. The pre-departure questionnaire took approximately 15-20 minutes to complete. Items from the pre-departure questionnaire were used within the feedback components of the intervention conditions. Relevant information (e.g., intentions to drink while abroad, perceptions of peer and host national behavior within the study abroad environment, Sojourner Adjustment goals) were preloaded into the feedback using the DatStat Illume system.

***Demographics.*** Participants completed a series of questions regarding age, sex, class year, and ethnicity. Participants also indicated how many weeks they would be studying abroad and indicated the country location of their study abroad program (e.g., Spain, India).

***Past month alcohol use.*** Drinking in the month prior to departure was assessed with the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985; Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990). Participants indicated how many drinks they typically had on each day of a typical week over the past 30 days. The DDQ was used to calculate typical weekly drinking used in analyses. The DDQ also allowed for the calculation of “average drinks” consumed in a typical week by dividing the total number of drinks by the number of drinking days. Total drinks and average drinks consumed in a typical week were utilized in the PNF conditions.

***Intended drinking behavior while abroad.*** Participants also indicated intended typical weekly drinking while abroad using a DDQ. The intended DDQ allowed for calculation of intended weekly drinking while abroad and average drinks consumed while abroad used in the PNF conditions.

***Past month alcohol-related consequences.*** The Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) assessed alcohol-related problems experienced over the past month (“0 = never” to “4 = 10 or more time”). The RAPI consisted of 23 items and included items related

to academic and social problems (e.g., “Not able to do your homework or study for a test,” “Had a fight, argument, or bad feelings with a friend”) as well as items assessing physiological consequences such as increased tolerance, blacking out, and passing out. Internal reliability for the RAPI was adequate in the sample ( $\alpha = 0.85$ ).

*Perceived alcohol use of region-specific study abroad peers.* Participants were asked about the perceived drinking of a typical UW student studying abroad in the region of their program. Participants completed the modified Drinking Norms Rating Form (DNRF; Baer, Stacy, & Larimer, 1991), which is modeled after the DDQ and asks participants to indicate how many drinks they believe a typical UW study abroad student living in their host region drinks on each day of a typical week. Region-specific study abroad peers were selected as the reference group in order to provide students with region-specific drinking norms of study abroad peers collected during a prior survey of UW study abroad student drinking (Pedersen et al., 2010b). Limited *Ns* within each country collected in the prior sample inhibited the presentation of meaningful country-specific normative drinking rates in the personalized normative feedback. Thus, feedback was provided based on each of the five world regions to which UW students generally travel (Europe, Asia, Oceania, Latin America, and non-traditional study abroad locations encompassing countries in the Middle East, Africa, South Asia, and West Asia). The countries included within each region were presented with the DNRF so participants knew which countries to consider in their perceptions. Only the countries where UW students studied in this and the prior study were included in this description (30 different countries). The DNRF was used to compute typical perceived weekly drinking and typical perceived average drinks per occasion presented in the PNF conditions.

*Perceived alcohol use of country-specific host nationals.* Participants were also asked to

complete a DNRFB and one open-ended question about their perceptions of drinking by native adults of their host country (i.e., host country nationals). Participants were asked to estimate the percentage of abstainers in their host country. This question was informed by the available information from the WHO Global Status Report on Alcohol (2004) on country-specific drinking rates across the 30 countries included in the study. These statistics were readily available from the WHO report and comparisons between perceived and actual drinking rates were utilized in the personalized normative feedback.

*Sojourner Adjustment.* The Sojourner Adjustment Measure (SAM; Pedersen et al., 2011c) was developed by the PI of this study to assess aspects of the cultural adjustment process among students living temporarily abroad. At pre-departure, this measure was used to assess intended goals relating to the six factors of Sojourner Adjustment developed through theory and factor analyses: (1) social interaction with host nationals (e.g., “socialize a good deal with local people from my host country”), (2) cultural understanding and participation (e.g., “enhance my understanding of my host country's culture”), (3) language development and use (e.g., “increase my understanding of my host country's language [or dialect/idioms]”), (4) host culture identification (e.g., “subscribe to the values of my host country”), (5) social interaction with conationals (e.g., “have meaningful social interactions with Americans”), and (6) homesickness/feeling out of place (e.g., “feel out of place in my host country”). Factors 1 through 4 relate to positive aspects of Sojourner Adjustment, while factors 5 and 6 identify negative aspects of the construct.

The SAM has displayed adequate convergent validity with established measures of acculturation (Pedersen et al., 2011c). Specifically, the positive factors of Sojourner Adjustment positively correlated with the host culture identification factor of the Vancouver Index of

Acculturation (VIA; Ryder, Alden, & Paulhus, 2000) and Berry's (1998) integration and assimilation acculturation orientations as assessed by the Acculturation, Habits, and Interests Multicultural Scale for Adolescents (AHIMSA; Unger et al., 2002). The negative Sojourner Adjustment factors negatively correlated with these aforementioned factors, as well as positively correlated with home culture (i.e., U.S. culture) identification of the VIA and the separation acculturation orientation of the AHIMSA. The pre-departure SAM asked participants to indicate their agreement with each of the 24 items on a 7-point Likert scale from "1 = disagree strongly" to "7 = agree strongly." Participants were asked to consider their upcoming time abroad and indicated the degree with which they agreed they would experience each item (e.g., "During my time abroad, I will spend a good amount of time meeting and conversing with local people" [factor 1]). The 24-item pre-departure SAM is included in Appendix IA. The internal reliability estimates for the six factors were adequate, though host culture identification was less than adequate ( $\alpha = 0.81$  for social interaction with host nationals,  $\alpha = 0.84$  for cultural understanding and participation,  $\alpha = 0.81$  for language development and use,  $\alpha = 0.58$  for host culture identification,  $\alpha = 0.70$  for social interaction with co-nationals,  $\alpha = 0.75$  for homesickness/feeling out of place).

***Reasons for drinking.*** Two subscales from the Drinking Motives Questionnaire Revised (DMQ-R; Cooper, 1994) were included to assess (1) social reasons for drinking (e.g., "to be sociable") and (2) coping reasons for drinking (e.g., "to forget your worries"). Participants rated the frequency to which they drank for each of 10 reasons (five from each subscale) within the past month. Items were rated from "1 – almost never/never" to "5 – almost always/always." Studies have supported the reliability and validity of the DMQ among college students (e.g., Martens, Rocha, Martin, & Serrao, 2008). Reliability estimates for the coping subscale and social

subscales were  $\alpha = 0.77$  and  $\alpha = 0.92$ , respectively.

**Follow-up questionnaires.** Participants completed four follow-up questionnaires sent by email at (1) one-month abroad, (2) approximately two-months abroad, (3) during the last month abroad, and (4) one-month post-return (i.e., 30 days after return to the U.S.). These questionnaires were similar in content to the pre-departure survey except where indicated below. Measures from the pre-departure questionnaire were repeated at these four follow-up points to assess for changes in actual and perceived drinking, alcohol-related consequences, and Sojourner Adjustment factors. Closeness to peers and host nationals within one's host country was assessed at post-return to consider how one felt "during the study abroad trip." These follow-up questionnaires took between 10 and 15 minutes to complete. During all follow-up surveys, participants were instructed to consider the "past month only" when completing their responses to the questions. They were further prompted to consider "the past month since you have been home from your trip" on the post-return questionnaire. The exceptions to this were on the SAM and for the closeness to peers and host nationals questions (see description below).

***Past month alcohol use.*** Drinking during the past month for each of the four follow-up surveys was assessed with the DDQ. This measure was used to calculate typically weekly drinking (i.e., total drinks per weeks) utilized in analyses.

***Past month alcohol-related consequences.*** The RAPI was included at each follow-up assessment and asked participants to indicate their experience of each of the 23 consequences over the past month. Items were summed to create a composite score used to examine changes in alcohol-related consequences over time. The mean internal reliability estimate for the three RAPIs in the monthly follow-up surveys was  $\alpha = 0.87$  and  $\alpha = 0.90$  for the post-return RAPI.

***Perceived alcohol use of region-specific study abroad peers and country-specific host***

*nationals*. Items assessing region-specific study abroad peer alcohol use (DNRF) and country-specific drinking perceptions were assessed similarly to pre-departure at each follow-up assessment. Variables computed from these follow-up measures of perceived alcohol use were used to compare changes in perceptions over time.

*Sojourner Adjustment*. The SAM was included at each follow-up assessment; however, wording of the items varied slightly from the pre-departure questionnaire. During the first-, second-, and third-monthly follow-up questionnaires, participants indicated the degree to which they experienced each of the 24 SAM items on a 7-point Likert scale from “1 = disagree strongly” to “7 = agree strongly” in the past month while abroad (e.g., “During the past month abroad, I spent a good amount of time meeting and conversing with local people” [factor 1]) (see Appendix IB for the monthly follow-up SAM). In the post-return follow-up questionnaire, participants indicated their agreement with the 24 SAM items based on their entire trip abroad (see Appendix IC for the post-return follow-up SAM). Thus, the pre-departure SAM assessed expected engagement in SAM items, the monthly follow-up SAMs assessed actual engagement in items during the past month abroad, and the post-return follow-up SAM assessed actual engagement in items during the entire trip abroad. The internal reliability estimates for the three monthly follow-up questionnaires were adequate. The mean of the three estimates for each of the six factors were  $\alpha = 0.89$  for social interaction with host nationals,  $\alpha = 0.88$  for cultural understanding and participation,  $\alpha = 0.86$  for language development and use,  $\alpha = 0.68$  for host culture identification,  $\alpha = 0.65$  for social interaction with co-nationals, and  $\alpha = 0.80$  for homesickness/feeling out of place. The post-return SAM also displayed adequate reliability ( $\alpha = 0.91$  for social interaction with host nationals,  $\alpha = 0.91$  for cultural understanding and participation,  $\alpha = 0.89$  for language development and use,  $\alpha = 0.76$  for host culture identification,

$\alpha = 0.65$  for social interaction with co-nationals,  $\alpha = 0.83$  for homesickness/feeling out of place).

***Closeness to reference groups.*** Two adaptations of the Inclusion of Other in the Self scale (IOS; Aron, Aron, & Smollen, 1992) assessed participants' (1) closeness to region-specific study abroad peers and (2) closeness to country-specific host nationals at post-return survey. The IOS originated as a measure of closeness to a romantic relationship partner but has been adapted to assess closeness to salient groups in other research (Mashek, Cannaday, & Tangney, 2007; Tropp & Wright, 2001). The measure contained seven pictures of two circles each; one representing the participant (self) and the other representing either region-specific study abroad peers or country-specific host nationals (other). The two circles overlap to varying degrees and participants chose the picture that best represented how they felt toward both reference groups during their trip. As in other questions regarding region-specific peers, countries within specific regions were specified (e.g., "Europe region contains data from students studying in Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Russian Federation, Spain, Sweden, Switzerland, and the United Kingdom.")

**Post-intervention Questionnaire.** In the three intervention conditions, immediately after receiving their personalized feedback participants received a brief questionnaire assessing for current context and attention to the feedback. Participants were asked how long they initially spent reviewing the feedback (e.g., approximate time in minutes), whether they printed the feedback or not, whether or not they clicked on the links included in the feedback, and whether they intended to review the feedback further.

### **Intervention Conditions**

The study was based on a 2 x 2 longitudinal repeated measures randomized design. Four conditions included (1) assessment only control, (2) personalized normative feedback only

(PNF), (3) Sojourner Adjustment feedback only (SAF), and (4) a combination of personalized normative feedback and Sojourner Adjustment feedback (PNF + SAF).

**Control condition.** The assessment only control condition included online assessment at pre-departure, monthly follow-ups, and one month post-return assessment. Assessment questionnaires were the same in the control condition as they were in intervention conditions. Control participants did not receive any feedback after the completion of the pre-departure questionnaire. They received the same incentives for survey completion as the intervention condition participants.

**Personalized normative feedback only condition (PNF).** Immediately after completing the pre-departure questionnaire, participants in the PNF only condition were presented with on-screen PNF containing information about (1) region-specific study abroad peers and (2) country-specific adults living in the country (i.e., host country nationals). This feedback is described in detail below and an example PNF from a student studying abroad in Ireland is included in Appendix II.

***Region-specific study abroad peers.*** PNF contained two sets of three descriptive items accompanied by a figure: (1a) The number of drinks per week the individual intended to drink while abroad, (2a) the number of drinks per week they perceived the typical UW student studying abroad in their host region drank, and (3a) the number of drinks per week a typical UW student studying abroad in their host region actually drank. The second set of descriptive items focused on average drinks per occasion: (1b) The average number of drinks per occasion the individual intended to drink while abroad, (2b) the average number of drinks per occasion they perceived the typical UW student studying abroad in their host region drank, and (3b) the average number of drinks per occasion a typical UW student studying abroad in their host region

actually drank. Drinks per week was selected based on previous work documenting that intended drinks per week associated with both perceived drinks per week of study abroad peers and with students' actual drinks per week while abroad (Pedersen et al., 2009; 2010b). Average drinks per occasion was selected for inclusion in the PNF due to the predictive impact of average drinks on alcohol-related consequences while abroad over and above the impact of frequency of use (Hummer et al., 2010). Intended drinking while abroad (drinks per week and average drinks per occasion) was included due to the connection between planned and actual behavior (Ajzen, 1985; Triandis, 1977) and findings that intentions to drink heavily while abroad predict actual behavior within the foreign environment (Hummer et al., 2010; Pedersen et al., 2010b). In addition, this method of including intended drinking, perceived drinking, and actual drinking using the variables included here has been successfully utilized in another online feedback preventive intervention with college students targeting high-risk 21<sup>st</sup> birthday events (Neighbors et al., 2009).

For the actual norms (3a and 3b described above), we collected drinking data from approximately 300 UW study abroad students from our prior work with this population (see procedures in Pedersen et al., 2010b). Theory (Festinger, 1954; Latane, 1981) and research (e.g., Lewis & Neighbors, 2004; 2007; Walters & Neighbors, 2005) suggests that greater specificity of the referent group exerts more impact on individual drinking. Therefore we decided to present actual norms to students using more specific groups rather than general "all students studying abroad." However, numbers of participants within this sample of study abroad students used to establish drinking norms was not large enough to provide meaningful normative data for specific countries. Thus, region-specific study abroad peer PNF was presented to students based on the five world regions identified by the UW Study Abroad Office as typical locations where students

from UW study (Europe, Asia, Oceania, Latin America, and non-traditional study abroad locations). This provided students with comparisons to school- (UW) and region-specific referents. The countries included in each region were specified on the PNF (e.g., “Note: Your host region, Asia, contains data from UW students who previously studied in China, Japan, Cambodia, Taiwan, Thailand, South Korea, Vietnam, Singapore, Samoa, and the Philippines. Information is based on a sample of over 300 UW students who studied abroad during 2008 and 2009”).

***Country-specific host nationals.*** Prior research suggests that students’ perceptions of host country nationals predicted actual drinking behavior while abroad (Pedersen et al., 2011a). Thus, information regarding the drinking behavior of adults living in the host country was included in the PNF. In the pre-departure questionnaire, participants indicated their perceptions regarding typical weekly drinking and the rates of abstinence in their host country. The World Health Organization (WHO) has collected statistics for these drinking variables and compiled a detailed report of country-specific statistics in 2004. On the country-specific adult nationals piece of the PNF, the participant’s perceptions of the rates of drinking in their host country were presented alongside the actual drinking rates within that country. Abstinence rates were available in the WHO Report for all countries. For typical weekly drinking, the yearly per capita consumption level reported in the WHO Report was divided by 52 weeks and converted to standard U.S. drink measurements (e.g., milliliters converted to ounces). This yielded the best estimate available of typical weekly drinking. The source of this information was included on the PNF and a link to the two to three page summary report for the specific country of study from the WHO website was provided.

***Generation of feedback.*** Feedback content by country and region was prepared prior to

study launch and preloaded into the online feedback using the DatStat Illume program. This allowed the generation of immediate PNF based on personal drinking data collected during the pre-departure questionnaire and actual norms of region and country-specific referents. The feedback consisted of two pages of graphics and text with additional links. An option to print the feedback was included; thus, participants were able to print PNF after the initial viewing. One week into their study abroad trip, participants were sent an email with a link to their PNF. This served to provide participants with easy access to the PNF from their email so they could review the material while abroad from this accessible source if they chose to do so.

**Sojourner Adjustment feedback only condition (SAF).** As described above, all participants completed the pre-departure Sojourner Adjustment Measure (SAM) regarding their anticipated experience in each of the six aspects of Sojourner Adjustment. In the SAF, participants were given feedback based on their responses to the 24 SAM items. This feedback is described in detail below and an example SAF from a student studying abroad in Italy is included in Appendix III.

Participants first saw a graph depicting their responses to the SAM items. The graph was divided into six sections; one for each of the six SAM factors to show participants their expected experience in each of the six areas. The succeeding six pages followed a similar format with specific Sojourner Adjustment factor content. For example, the next page contained information for the social interaction with host nationals factor. Participants were provided with statements such as “You indicated that during your time abroad you will ‘Socialize a good deal with local people from your host country’ and ‘Have meaningful social interactions with local people.’” Items with indicated responses of “5 – agree slightly,” “6 – agree moderately,” and “7 – agree strongly” from the pre-departure SAM were included on the individual participant’s SAF. These

goals were then followed by tips and strategies for how to meet these Sojourner Adjustment goals while abroad. Tips and strategies were generated from two focus groups (10-12 students per focus group) with previous study abroad students prior to the development of the SAF. Each Sojourner Adjustment factor feedback page was followed by country-specific pictures of the study abroad location and country-specific links to relevant factor content (e.g., an online “English to Spanish” translator for a student studying abroad in Spain).

*Focus groups.* Consistent with use of peer norms in the PNF, the SAF utilized peer referents to provide tips and strategies for active engagement in the culture while abroad. One hundred and eighty-eight potential study abroad student consultants were recruited through an available project within the PI’s lab. This project contained a large sample of UW students who were asked at baseline to indicate whether they participated in a study abroad program during their time at the UW. Project participants who indicated prior study abroad participation and who indicated they would be interested in receiving information about future research study participation were emailed an invitation to sign up for a focus group to discuss Sojourner Adjustment factors and alcohol use while abroad. Of the 50 students who expressed interest, two to three students from each of the five regions (Europe, Asia, Oceania, Latin America, and non-traditional study abroad locations) were randomly selected to participate in each of the two focus groups. Eighteen of those selected attended one of the two focus groups. Moderated by the PI, students discussed tips and strategies for meeting goals of Sojourner Adjustment while abroad (e.g., where did you go to meet people? How did you find out about local events? What activities would be considered rude by the locals?, What did you do to deal with anxiety about being far from home?). Focus groups were digitally recorded with all identifiable material removed, transcribed, and coded for tips/strategies by topic (Krueger, 1997a; 1997b). Tips/strategies were

reviewed with advisors and UW IPE staff members to ensure appropriateness, safety, and feasibility. Direct de-identified student quotes that best captured the specific items from the SAM were included in the SAF. Content was identified as being generated from students who completed study abroad programs at the UW. For example, participants were presented with “Here are some quotes from UW students who recently completed study abroad programs. They describe their experiences with meeting goals and setting expectations of social interaction with local people during their trips” which was followed by the content-specific quotes for the relevant Sojourner Adjustment factor.

*Specific content by factor.* The four positive SAM factors (social interaction with host nationals, cultural understanding and participation, language development and use, host culture identification) included tips/strategies for approaching these goals, while the two negative SAM factors (social interaction with co-nationals and homesickness/feeling out of place) include tips/strategies for limiting experience with these aspects. In addition to the student-generated content, we provided one to five links to websites for local cultural events, news, and language dictionaries. These links also contained information regarding country-specific cultural activities, practices, and general descriptions of typical adjustment stages while abroad. While the SAM factor content was standardized for all participants studying abroad in a specific country, goals varied by participant. If students did not endorse any items within a component, they were presented with the tips and strategies without the personalized goals.

Content and resources for the (1) social interaction with host nationals factor included tips regarding engaging locals in interesting conversations and frequenting areas where locals meet to talk. A link to a country-specific culture and an etiquette fact sheet was included. For the (2) cultural understanding and participation factor, tips like preparing for travel ahead of time

and asking local people for site-seeing recommendations were included. Also, a link to recommended travel and excursions in the host country, as well as a website link to a local newspaper (written in English) and a listing of cultural events, was included for each country. For the (3) language development and use factor, participants were presented with tips and strategies for how to best learn the local language (e.g., practice with friends) as well as two online translation dictionary resources. Content for the (4) host culture identification factor included tips and strategies for cultural immersion and host country identification, as well as a link to content describing the typical political, religious, and economic beliefs and values of the host country.

Tips and strategies for limiting (5) social interaction with co-nationals in partying situations was be provided. The focus group-generated content for this category was examined closely by researchers to ensure that information included in the SAF did not lead students to alienate themselves from American peers (e.g., advice such as “do not spend any time with Americans”). While prior work with international students suggests co-national relationships can ease difficulties with Sojourner Adjustment (Ward & Kennedy, 1993a; Ward & Rana-Deuba, 2000), our research suggests this factor associates with risk for alcohol-related consequences, separation from the host culture, and with homesickness (Pedersen et al., 2011c; 2011d). Thus, the focus of the content was on describing the potential supportive role that American peers can provide during the study abroad experience; however the content described the importance of not sacrificing relationships with host nationals in order to connect with American peers in social situations (e.g., drinking in bars and restaurants, partying). For example, advice such as “just grab a couple friends as opposed to a big group and you are a lot more likely to meet people” and “[there was] a bunch of other people from the program and they stayed in most of the time and

partied by themselves. I felt that they didn't really get to know the city very well because most of the time they stayed in and had fun by themselves.” Using American peers as support when feeling homesick was emphasized in the (6) homesickness/feeling out of place feedback page (e.g., “I wrote a lot of postcards. I sent a postcard to my best friend every single week. It's helpful because it's a way to be in contact with people you are missing while also sharing the good of your experiences”). This feedback page also contained information outlining the stages of “culture shock” experienced by students. Winkelman (1994) and others (Black & Mendenhall, 1990; Brislin & Kim, 2003) argue that increasing students’ knowledge of these stages can assist in the adjustment process while abroad. A link to Winkelman’s article was included in the SAF and resources for dealing with anxiety and depression while abroad.

**Combined PNF and SAF condition.** Participants in the combined condition first received PNF followed by SAF. All procedures described in the above conditions were otherwise the same. This condition included both the promotion of a protective factor (i.e., reinforcing Sojourner Adjustment goals in SAF) while targeting a risk factor (correcting misperceptions of perceived norms in PNF). Promoting protective factors may attenuate the experience of risk factors for young people (Hawkins, Catalano, & Miller, 1992); thus the combined condition was hypothesized to be more efficacious than single component conditions.

## Results

### Analytic Plan

All data were collected and maintained on the web via the secure web-based DatStat Illume program. The web survey allows participants to complete the survey at their convenience and reduces the chances of data entry errors. Confidential data is stored on the secure web server and downloaded for statistical analyses. Descriptive reports of results, reliability estimates, and bivariate statistics (e.g., correlation analyses, mean comparisons) were computed with IBM SPSS version 18. Main effects of the intervention and mediator/moderator analyses were examined with multilevel regression analyses (Snijders & Bosker, 1999) using Hierarchical Linear Modeling version 6 (HLM 6: Raudenbush, Bryk, Cheong, & Congdon, 2001). HLM permits the simultaneous examination of relationships among variables at different levels, for example variables measured over assessment periods assumed to fluctuate (e.g., degree of Sojourner Adjustment, perceived norms, drinking levels) with variables considered to have more stable characteristics (i.e., intervention conditions). Using this framework, time was specified as a Level 1 time varying predictor nested with individuals (Level 2). Outcome variables were chosen based on the specific aims identified above. As we were most interested in preventing heavy drinking and alcohol-related problems while abroad, total drinks per week from the DDQ was the main drinking outcome and the composite score from the RAPI was the main alcohol-related consequences outcome. Except for instances of missing data, most students completed either two or three assessments while abroad, depending on the length of time they were away. Preliminary analyses indicated that the first month abroad and last month abroad had more consistent patterns, as well as substantive import (i.e., initial period of time away and preparing to return to the US). Because of this, participants' outcome data included the first and last months

abroad, in addition to the baseline and post-return assessments (four time points). Thus, for students with three assessments abroad, the middle assessment is excluded from the current analyses.

### **Preliminary Analyses**

Preliminary analyses were conducted to examine extreme values, missing data, and variable distributions among outcome variables. Examining boxplots of distributions and standardized scores, a few data points appeared to be extreme. For example, one participant indicated experiencing every problem on the RAPI during the post-return survey, but indicated no drinking during the month. False or incredible data such as this were removed from the analysis file. Values outside three standard deviations from the mean were rare and retained if they contained possible/consistent values (e.g., a participant could have consumed 20 drinks one night, particularly if other datapoints indicated drinking between 8 and 15 drinks on other nights assessed). Impossible values were replaced as missing values. Drinking and alcohol-related consequences are count variables (i.e., integer valued and bounded at zero), which can have skewed distributions when the overall mean is low (as is the case in many datasets with college student samples). These qualities would violate several assumptions of statistical models assuming normally distributed errors, and hence, an alternative model with a Poisson distribution for the Level 1 errors was used (Atkins & Gallop, 2007). In Poisson models, covariates are connected to the outcome via a natural logarithm link function, much as the logit transformation is used with logistic regression. Because of this, regression coefficients are exponentiated (i.e., raised to the base  $e$ ) for interpretation and referred to as “rate ratios.” Rate ratios of 1.0 indicate no effect, while those with a value greater than 1 indicate a percentage increase in counts. For example, a raw coefficient estimate of  $\beta = .16$  for a treatment condition yields a rate ratio of

1.17. We would interpret this as, compared to a control group, the treatment group experienced a 17% increase in drinking (or other outcome). Rate ratios less than 1 (e.g., 0.93) indicate a percentage decrease in the outcome (e.g., 7% reduced rate of drinking).

**Randomization.** Baseline equivalence between conditions was examined to explore randomization effectiveness. As stratified randomization was employed on the pre-departure DDQ, no significant differences existed between drinking levels for participants in the four conditions. Although we did not randomly assign participants to condition based on pre-departure consequences, there were no observable differences for consequences between participants at baseline.

**Missing values.** The primary analytic tool used was hierarchical generalized linear modeling (HGLM), which allows for unbalanced data. HGLM gives heavier weights to participants with more non-missing values. HGLM also assumes that missing values are missing at random as opposed to non-ignorable (Schafer & Graham, 2002). Possible attrition bias was tested by evaluating whether baseline outcomes differed between dropouts and completers. There were no differences in outcomes (alcohol-related consequences, drinking) between those with no follow-up data after the pre-departure survey and those who completed follow-up surveys. This was the case regardless of condition.

### **Post-feedback Questionnaire**

After reviewing the feedback, 141 of the 253 participants in the feedback conditions (56%) responded to a brief four-question survey about their engagement in the questionnaire. All intervention condition participants were asked to complete this questionnaire. Overall, participants reported reviewing the feedback for 6.45 minutes ( $SD = 6.94$ ). Four percent reported printing the feedback, with 31% clicking links embedded in the feedback and 52% indicating

they would save the link for the feedback for further review at a later time. Participants in the PNF condition reported reviewing the feedback for approximately 4.2 fewer minutes than the SAF condition participants and approximately 6.1 fewer minutes than the PNF + SAF condition participants. This may have been due to the PNF containing only two pages of text while the SAF contained seven. There were no meaningful differences between conditions and printing of the feedback. A smaller percentage of PNF participants (10%) reported clicking on links in the feedback compared to SAF participants (42%) and 48% of PNF + SAF condition participants. Again, this may have been influenced by the number of links contained in the PNF (two) versus SAF (approximately 12). Finally, a smaller percentage of PNF participants (36%) reported saving the feedback link for further review compared to SAF participants (67%) and PNF + SAF condition participants (62%).

### **Aim 1: Pilot Testing of Online Personalized Feedback Pre-departure Interventions**

The following model was used to determine main effects of the intervention conditions compared to control. Level one contained the time variables and level two contained the individual variables (intervention conditions).

$$\text{Level 1: } DV_{ii} = \pi_{0i} + \pi_{1i}(T1)_{ii} + \pi_{2i}(T2)_{ii} + \pi_{3i}(T3)_{ii} + \varepsilon_{ii}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \beta_{01}(Tx)_i + r_{00i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(Tx)_i \quad t \text{ indexes repeated measure}$$

$$\pi_{2i} = \beta_{20} + \beta_{21}(Tx)_i \quad i \text{ indexes individuals}$$

$$\pi_{3i} = \beta_{30} + \beta_{31}(Tx)_i$$

DV represents either total drinks per week from the DDQ or RAPI composite scores. T1, T2, and T3 are dummy coded time variables (T1 = pre-departure [coded 0] to first month abroad [coded 1], T2 = pre-departure [0] to last month abroad [1], T3 = pre-departure [0] to post-return [1]).  $Tx$  is a categorical predictor expanded into three dummy-variables to compare the three active

treatment conditions to the control (i.e., comparing control to PNF, control to SAF, and control to PNF + SAF). With this model, intercept treatment differences represent treatment differences at baseline (i.e., differences in baseline drinking or RAPI) and slope differences represent changes over the trip (predeparture to first month abroad [T1], predeparture to last month abroad [T2], predeparture to post-return[T3]). The intercept in the model included a random effect, which models the subject-specific heterogeneity in the outcome and controls for correlated data due to individuals.

**Drinking.** Parameter estimates, standard errors, and 95% confidence intervals can be found in Table 1. A graphical representation of the estimated means for each group can be found in Figure 1. The event rate ratio can be interpreted as the increased (if above 1.0) or decreased (if below 1.0) rate of drinking at each time point from baseline as compared to the control group. Results revealed that control participants reported drinking approximately 7.32 drinks per week at pre-departure, and participants in the three intervention conditions did not differ in their baseline rates of drinking compared to control. At first month abroad, control participants increased their drinking by a rate of 32% to a mean of approximately 9.68 drinks per week (exp [1.99 + .28]). These participants also increased their drinking by a rate of 45% from pre-departure to last month abroad; a mean of approximately 10.59 drinks per week. Participants in the three intervention conditions also reported increased drinking over time, however, only for SAF participants at first month abroad was this effect significant. SAF condition participants increased their drinking from approximately 6.70 drinks per week at baseline to nearly 12 drinks per week at first month abroad. This non-hypothesized finding represented a 31% increased rate of drinking compared to control group participants. At post-return, control participants drank similarly to pre-departure levels and there were no significant intervention effects on drinking at

post-return.

***Combined condition versus single intervention conditions.*** Analyses revealed that while drinking significantly increased during the first month abroad and last month abroad for combined PNF + SAF condition participants, there were no differences in increased rates of drinking between these participants and those in either PNF or SAF single-intervention conditions. At pre-departure PNF + SAF condition participants drank approximately 6.98 drinks per week. This number increased by a rate of 50% during the first month abroad (10.47 drinks per week) and leveled off at this amount during the last month abroad. Both were significant increases in drinking from pre-departure levels. Drinking at post-return was not significantly different from pre-departure for PNF + SAF condition participants. Despite these fluctuations in drinking, neither PNF nor SAF condition participants significantly differed in their rates of drinking at any time point compared to combined condition participants.

**Alcohol-related consequences.** A similar model using Poisson HGLM was fit to the RAPI data and Table 2 contains parameter estimates, standard errors, 95% confidence intervals, and event rate ratios. A graphical representation of the estimated means for each group can be found in Figure 2. Results showed a mean predicted RAPI score at baseline of 2.86 for the control group participants. There were no significant differences on RAPI scores at baseline between conditions. During the first month abroad, the control group experienced a non-significant decreased rate of consequences such that participants experienced 6% less consequences at the first month time point. Relative to control, none of the intervention conditions significantly differed in consequences at first month abroad. However, at the last month abroad, control participants increased consequences at a non-significant rate of 12%. Relative to the control group, SAF participants experienced a 31% reduction in consequences

relative to the increase in control participant problems ( $p = .05$ ). PNF participants experienced a 27% reduction in consequences relative to the increase in control participant problems, which was a marginally significant effect ( $p = .07$ ). There were no effects for the PNF + SAF condition on consequences compared to controls. At post-return, levels of alcohol-related consequences were again comparable across conditions.

***Combined condition versus single intervention conditions.*** Analyses again revealed no significant differences in rates of consequences between intervention conditions. PNF + SAF condition participants reported RAPI scores of approximately 2.99 at pre-departure. While this number did not significantly change during the first or last month abroad, combined condition participants reduced their alcohol-related consequences by 34% at post-return (score of 1.88 on the RAPI).

**Summary of main intervention effects.** Main intervention effects emerged for the SAF intervention and the PNF intervention (marginally significant). Compared to control participants, SAF participants reported increased drinking rates at first month abroad, but reported decreased rates of alcohol-related consequences at last month abroad. PNF participants reported a trend toward a decreased rate of consequences compared to control participants at last month abroad. There were no main intervention effects for the combined PNF + SAF intervention and there were no differences in drinking or consequences rates between the three intervention conditions.

## **Aim 2: Evaluation of Mediators and Moderators of Intervention Efficacy**

**Perceived norms as a mediator of PNF and PNF + SAF intervention effects.**

Perceived norms mediators were included as time-varying covariates at Level 1. Following Kenny et al. (2004), we examined the reduction in the treatment effects after including the hypothesized mediators. This model followed a three-step process. First it was determined if (a) main intervention effects were found. Then we determined if there were (b) intervention effects predicting the hypothesized mediator. Finally, we examined the (3) reductions in main effects after including the hypothesized mediator. We looked at intervention effects on all mediators (e.g., did PNF participants have lower perceived norms over the course of their trip), but only interpreted findings when intervention effects had been found for a particular outcome. Thus, we were interested in mediators of (1) SAF intervention effects on increased drinking during the first month abroad, (2) SAF intervention effects on reduced alcohol-related consequences at last month abroad, and (3) PNF intervention effects on reduced alcohol-related consequences during last month abroad. The PNF mediation effects demonstrated should be interpreted with the qualification that the main effects for PNF on consequences was marginally significant ( $p = .07$ ).

For the PNF and PNF + SAF conditions, we hypothesized that changes in perceptions about study abroad peers in the region and perceptions about host nationals in the country would mediate intervention effects. Perceptions assessed at each time point and challenged during the PNF portion of the feedback included perceptions of (1) total drinks per week among region-specific study abroad peers, (2) average drinks per occasion among region-specific study abroad peers, (3) country-specific abstinence rates, and (4) total drinks per week among country-specific nationals. These data were not skewed as outcome variables and analyses were run with a normal Gaussian distribution. In general, participants tended to perceive the drinking behavior of peers

as higher than their own reported behavior. For example, participants perceived study abroad peers drank 17.91 drinks per week, while the actual norm was 10.66 ( $SD = 9.21$ ) in the sample.

***Total drinks per week among region-specific study abroad peers.*** There were no observable main effects by condition for changes in perceived study abroad peers drinks per week. At pre-departure, control participants estimated peers drank approximately 15.67 ( $SE = 1.08$ ) drinks per week. This estimate increased to approximately 18.66 ( $SE = 1.10$ ) at first month abroad ( $p < .01$ ), to approximately 19.05 ( $SE = 1.11$ ) at last month abroad ( $p < .01$ ), and to approximately 18.15 ( $SE = 1.11$ ) at post-return ( $p < .05$ ). Despite these significant increases at each follow-up time point there were no effects of intervention participants compared to controls on changes in perceived drinks per week over time. PNF increased perceptions from approximately 14 drinks at pre-departure to 17 drinks at first month and 16 drinks at last month abroad and post-return. Combined PNF + SAF participants increased perceptions from approximately 16 drinks at pre-departure to 17 drinks at first month abroad to 18 drinks at last month abroad and 16 drinks at post return. Again, these effects were non-significant.

Since there were no main intervention effects on the hypothesized mediator (i.e., one of the criteria for mediation discussed in Kenny et al., 2004), we did not evaluate total drinks per week among region-specific study abroad peers as a mediator for the SAF intervention effects on increased drinking during the first month abroad, the SAF intervention effects on reduced alcohol-related consequences at last month abroad, or the PNF intervention effects on reduced alcohol-related consequences while abroad.

***Average drinks per occasion among region-specific study abroad peers.*** There were main effects for the PNF condition at last month abroad on changes in perceptions of average drinks. At pre-departure, control participants perceived a typical study abroad student in their

region drank approximately 2.24 (SE = 0.16) drinks per occasion. At first month abroad, this number increased to approximately 2.67 (SE = 0.17) drinks per occasion ( $p < .05$ ) and to approximately 2.72 (SE = 0.17) drinks per occasion at last month abroad ( $p < .01$ ). PNF participants reported decreased perceptions at last month abroad compared to control participants, reducing their perceptions from approximately 2.21 (SE = 0.23) drinks per occasion at pre-departure to approximately 1.73 (SE = 0.24) at last month abroad ( $p < .05$ ). Control participants reported perceptions of 2.59 (0.17) drinks at post-return, which was also significantly different from pre-departure perceptions ( $p < .05$ ). There were no intervention effects at first month abroad or post-return.

As PNF had a significant effect on the perceived average drinks hypothesized mediator, we evaluated the PNF treatment effects on reduction of alcohol-related consequences at last month abroad once the mediator was included in the model. The PNF effect on consequences during the last month abroad (rate ratio = 0.73 SE = 0.17, confidence interval = 0.52 to 1.02) was slightly increased when changes in average drink perceptions were added to the model (rate ratio = 0.74 SE = 0.17, confidence interval = 0.53 to 1.04). As these changes were subtle and marginally significant (according to a Sobell test; recall the main PNF effects on consequences were also marginally significant), it was determined that changes in average drink perceptions for region-specific study abroad peers did not mediate the relationship between PNF and alcohol-related consequences.

***Country-specific abstinence rates.*** There were main effects of intervention conditions on changes in perceived abstinence rates over time. Participants in the PNF condition reported increased perceptions of abstinence rates from pre-departure levels at first month abroad,  $\beta = 6.05$ , SE = 3.10 and at post-return,  $\beta = 6.05$ , SE = 2.96. Estimated means suggested that

participants increased their perceptions of abstinence rates from approximately 22.7% to 28% at both first month abroad and post-return ( $p < .05$  and  $p < .05$ , respectively). There were no observed effects for PNF participants at last month abroad. Conversely participants in the SAF condition reported decreased perceptions of abstinence rates from pre-departure levels at first month abroad,  $\beta = -10.11$ ,  $SE = 2.94$ , last month abroad,  $\beta = -7.05$ ,  $SE = 2.97$ , and at post-return,  $\beta = -7.01$ ,  $SE = 2.92$ , (all  $p < .05$ ). Estimated means suggested that participants decreased their perceptions of abstinence rates from approximately 15.73% at baseline to 5.6% at first month abroad, and to 8.7% at both last month abroad and post-return ( $p < .001$ ,  $p < .05$ , and  $p < .05$ , respectively).

As SAF had a significant effect on the perceived country-specific abstinence rates at first month and last month abroad, we evaluated the reduction in SAF treatment effects on drinking at first month abroad (recall this was a non-hypothesized significant increase in drinking for SAF) and alcohol-related consequences at last month abroad once the mediator was included in the model. For the first month abroad, the effect (rate ratio = 1.31, confidence interval = 1.02 to 1.68) was reduced to non-significance when the mediator was included (rate ratio = 1.15, confidence interval = 0.90 to 1.50). Thus, it appeared that decreases in perceived abstinence rates of country-specific nationals over time explained the observed effects of SAF on drinking at first month abroad.

For the last month abroad, the SAF treatment effect (rate ratio = 0.70,  $SE = 0.17$ , confidence interval = 0.50 to 0.96) was stronger (rate ratio = 0.64,  $SE = 0.18$ , confidence interval = 0.45 to 0.91) on alcohol-related consequences. Participants reported approximately a 30% reduced rate of consequences during the last month abroad compared to control and approximately a 36% reduced rate of consequences when this mediator was included in the

model. This indicated a potential suppression effect. A Sobell test revealed that the increase in effect when perceived norms were added to the model did not partially or fully mediate the SAF intervention effects on alcohol-related consequences.

***Total drinks per week among country-specific nationals.*** There were no observable main effects by condition for changes in perceived study abroad peers drinks per week. At pre-departure, control participants estimated host nationals drank approximately 12.02 (SE = 0.90) drinks per week. This estimate increased to approximately 14.42 (SE = 0.90) at first month abroad ( $p < .01$ ), to approximately 15.09 (SE = 0.91) at last month abroad ( $p < .001$ ), and to approximately 14.16 (SE = 0.91) at post-return ( $p < .05$ ). PNF participants reported increased perceptions at each time point as well, albeit perceptions were lower than control participants (approximately 12 drinks per week at pre-departure, 13 drinks per week at both first month and last month abroad, and 14 drinks per week at post-return). These differences between PNF and control were non-significant.

**Summary of perceived norms mediator effects.** Neither changes in perceptions of region-specific peers' total drinks per week nor average drinks per occasion mediated intervention effects on drinking or consequences. Changes in perceived total drinks consumed by host country nationals also failed to mediate intervention effects. Compared to control participants, PNF participants reported increased perceptions of abstinence rates in their host countries from pre-departure to first month abroad (i.e., believed more people in their country were abstinent over time). SAF participants reported decreased abstinence rates from pre-departure to first month abroad (i.e., believed more local people were drinkers) and this change at first month mediated the SAF intervention effect on increased drinking at first month abroad.

**Sojourner Adjustment mediator.** We hypothesized Sojourner Adjustment would

mediate intervention efficacy such that participants in SAF and PNF + SAF conditions who reported more engagement with positive Sojourner Adjustment factors and lower reports of negative Sojourner Adjustment difficulties while abroad would drink less and experience fewer consequences. Each of the six Sojourner Adjustment factors was evaluated over three time points (pre-departure intended engagement, first month abroad actual engagement, last month abroad actual engagement). The fourth time point of post-return was not included in this examination because post-return assessment of “the entire time abroad” included the two abroad time point assessments. Similar to perceived norms analyses, HGLM analyses were run assuming a normal distribution of Sojourner Adjustment factors. While estimated means are included below, there were no differences in any of the Sojourner Adjustment factors between conditions. As this did not satisfy the criteria for mediation (Kenny et al., 2004), effects of these mediators on drinking and alcohol-related consequences abroad were not evaluated.

***Social interaction with host nationals.*** At baseline, control participants reported a mean of 5.89 for their expected engagement with social interaction with host nationals ( $\beta = 5.89$ ,  $SE = 0.12$ ). This reduced to approximately 5.18 at first month abroad ( $\beta = -0.71$ ,  $SE = 0.13$ ,  $p < .001$ ) and increased to 5.41 at last month abroad ( $\beta = -0.48$ ,  $SE = 0.13$ ,  $p < .001$ ). There were no differences in this Sojourner Adjustment between conditions at each time point.

***Cultural understanding and participation.*** At baseline, control participants reported a mean of 6.50 for their anticipated engagement in this factor ( $\beta = 6.50$ ,  $SE = 0.07$ ). This reduced to approximately 6.23 at first month abroad ( $\beta = -0.27$ ,  $SE = 0.08$ ,  $p < .001$ ) and reduced to 6.10 at last month abroad ( $\beta = -0.40$ ,  $SE = 0.08$ ,  $p < .001$ ). There were no differences in this Sojourner Adjustment between conditions at each time point.

***Language development and use.*** At baseline, control participants reported a mean of

5.84 for their anticipated engagement in the language factor ( $\beta = 5.84$ ,  $SE = 0.13$ ). This reduced to approximately 5.35 at first month abroad ( $\beta = -0.51$ ,  $SE = 0.11$ ,  $p < .001$ ) and to 5.39 at last month abroad ( $\beta = -0.45$ ,  $SE = 0.11$ ). There were no differences in this Sojourner Adjustment between conditions at each time point.

***Host culture identification.*** At baseline, control participants reported a mean of 4.77 ( $SE = 0.10$ ) for the host culture identification factor. Participants reduced this factor to 4.56 for actual host culture identification during the first month abroad ( $\beta = 0.20$ ,  $SE = 0.10$ ,  $p < .001$ ). There were no differences at last month abroad for control participants and there were no differences in this Sojourner Adjustment between conditions at each time point.

***Social interaction with co-nationals.*** At baseline, control participants reported a mean of 4.82 ( $SE = 0.13$ ) for the social interaction with co-nationals factor. There were no differences over time for control participants and there were no differences in this Sojourner Adjustment between conditions at each time point.

***Homesickness/feeling out of place.*** At baseline, control participants reported a mean of 3.99 for their anticipated homesickness/feeling out of place ( $\beta = 3.99$ ,  $SE = 0.13$ ). There were no differences from baseline at first month abroad, but this reduced to approximately 3.60 at last month abroad ( $\beta = -0.39$ ,  $SE = 0.13$ ,  $p < .01$ ). There were no differences in this Sojourner Adjustment between conditions at each time point.

**Sojourner Adjustment exploratory interaction analyses.** Since we included the post-return assessment of Sojourner Adjustment “over the entire trip abroad,” we chose to evaluate interactions between each of the Sojourner Adjustment factors and intervention conditions at the end of the trip to determine if different intervention groups reported varying levels of alcohol-related consequences based on differences in the factors “over the entire trip abroad.” As factors

were assessed at the end of the trip, these were not conceptualized as mediators but were considered exploratory interactions. No conclusions about causality can be inferred. To keep parsimony of analyses and due to rationale that Sojourner Adjustment could contribute to increased but non-problematic drinking, we evaluated alcohol-related consequences only. Only interactions that were significant are included below. Interaction effects that were significant at specific time points (i.e., pre-departure, first month abroad, last month abroad, post-return) were graphed with low values of this continuous variable specified as one standard deviation below the mean and high values specified as one standard deviation above the mean (Aiken & West, 1991).

***Social interaction with host nationals.*** There were no significant exploratory interaction effects for this Sojourner Adjustment factor.

***Cultural understanding and participation.*** Exploratory interaction analyses revealed that a greater degree of cultural understanding and participation predicted an increased rate of consequences during the last month abroad (rate ratio = 1.36, SE = .13, confidence interval = 1.06 to 1.75). This non-hypothesized effect suggested a one unit increase in this positive Sojourner Adjustment factor predicted a 36% increase in the rate of consequences experienced. There was a SAF intervention X cultural understanding and participation interaction effect (rate ratio = 0.56, confidence interval = 0.37 to 0.87) such that participants with both a low degree and a high degree of this positive Sojourner Adjustment factor who were in the control condition reported approximately 73% more consequences than SAF participants with a low and high degree of cultural understanding and participation (see Figure 3, top). There was also a non-hypothesized PNF intervention X cultural understanding and participation interaction (rate ratio = 0.68, SE = .14, confidence interval = 0.50 to 0.92) such that control participants with high

cultural understanding and participation reported an approximate mean score of 3.55 consequences, while those high in this factor in the PNF condition reported a mean of 2.18 consequences (see Figure 3, bottom).

***Language development and use.*** Exploratory interaction analyses revealed that a greater degree of language development and use was predictive of an increased rate of consequences during the last month abroad (rate ratio = 1.31, SE = .10, confidence interval = 1.09 to 1.59). This non-hypothesized effect suggested a one unit increase in language development and use predicted a 31% increase in the rate of consequences experienced. There was also a non-hypothesized PNF intervention X language development and use interaction (rate ratio = 0.78, SE = .12, confidence interval = 0.62 to 0.99) such that participants with a high degree of this positive Sojourner Adjustment factor who were in the control condition reported an approximate mean score of 3.77 consequences, while those high in this factor in the PNF condition reported a mean of 2.56 consequences (see Figure 4).

***Host culture identification.*** There were no significant exploratory interaction effects for this Sojourner Adjustment factor.

***Social interaction with co-nationals.*** Exploratory interaction analyses revealed that a greater degree of social interaction with co-nationals predicted an increased rate of consequences during the first month abroad (rate ratio = 1.28, confidence interval = 1.06 to 1.55) and during the last month abroad (rate ratio = 1.24, confidence interval = 1.04 to 1.49). A one unit increase in social interaction with co-nationals corresponded to a 28% increase in the rate of consequences experienced at first month abroad and 24% increase in consequences at last month abroad. At first month abroad, there was an SAF intervention X social interaction with co-nationals interaction effect (rate ratio = 0.64, confidence interval = 0.48 to 0.86) such that

participants with a high degree of this negative Sojourner Adjustment factor who were in the control condition reported an approximate mean score over 2.5 times that of SAF condition participants high in this factor (4.18 versus 1.55) (see Figure 5, top). At last month abroad, there was a non-hypothesized PNF intervention X social interaction with co-nationals interaction effect (rate ratio = 0.66, confidence interval = 0.49 to 0.90) such that participants with a high degree of this negative Sojourner Adjustment factor who were in the control condition reported an approximate mean score nearly 2.5 times that of PNF condition participants high in this factor (4.23 versus 1.79) (see Figure 5, top).

***Homesickness/feeling out of place.*** Exploratory interaction analyses revealed that a greater degree of homesickness/feeling out of place predicted an increased rate of consequences during the last month abroad (rate ratio = 1.24, SE = .09, confidence interval = 1.04 to 1.46). A one unit increase in homesickness/feeling out of place corresponded to a 24% increase in the rate of consequences experienced. There was a marginally significant SAF intervention X homesickness/feeling out of place factor interaction (rate ratio = 0.78, confidence interval = 0.61 to 1.00) such that participants with a high degree of this negative Sojourner Adjustment who were in the control condition reported an approximate mean score of 3.50 consequences, while those high in this factor in the SAF condition only reported a mean of 1.98 consequences (see Figure 6).

**Summary of Sojourner Adjustment mediator effects and exploratory analyses.**

Overall, participants expected to experience higher levels of the six Sojourner Adjustment factors than they actually did abroad. The exception was for host culture identification at last month abroad, where participants did not differ from baseline expectation; for social interaction with co-nationals, where participants met their expectations of this factor at both first and last

month abroad; and for homesickness/feeling out of place, where participants met their expectation of homesickness at first month abroad but reported less experience of this negative Sojourner Adjustment factor at last month abroad. None of the six Sojourner Adjustment factors mediated the observed intervention effects.

Exploratory analyses of intervention X Sojourner Adjustment factors assessed at post-return concerning “the entire trip abroad” revealed interesting effects for four of the six Sojourner Adjustment factors. Compared to controls with comparable reported levels of factors, the SAF intervention appeared to work best for those who reported both low and high cultural understanding and participation and those who reported more engagement in negative Sojourner Adjustment factors (i.e., high social interaction with co-nationals, high homesickness/feeling out of place). SAF participants low in social interaction with co-nationals reported slightly more consequences than control participants low in this factor. The PNF intervention appeared to work best for participants high in cultural understanding and participation, language development and use, and social interaction with co-nationals. PNF participants low in these factors experienced consequences at a slightly higher rate than control participants high in these factors.

**Region of study moderator.** We hypothesized that those studying abroad in the heavier drinking regions (i.e., Europe and Oceania) would benefit most from intervention conditions. Participants studying in Europe and Oceania were combined to compare drinking, consequences, and intervention effects to those participants studying in Asia, Latin America, and non-traditional regions in the Middle East, Africa, South Asia, and West Asia combined. The majority of participants in each conditions studied in Europe (71% in control, 68% in PNF, 74% in SAF, 81% in PNF + SAF). A chi-square test revealed no meaningful differences in variability across the regions between each of the four conditions. For parsimony in analyses and due to limited Ns

within each of the non-European regions, this variable was coded “1” for Europe/Oceania and “0” for Asia, Latin America, and non-traditional regions. A oneway analysis of variance test revealed no significant differences in drinking or consequences between Asia, Latin America, and non-traditional regions.

***Drinking.*** Participants in region categories did not differ in drinking patterns at pre-departure. Compared to participants in Asia, Latin America, and non-traditional regions, at first month abroad Europe/Oceania participants significantly increased their drinking rates by approximately 1.9 times their baseline drinking level (rate ratio = 1.91, confidence interval = 1.22 to 2.99) and by approximately 1.7 times their baseline drinking level at last month abroad (rate ratio = 1.70, confidence 1.10 to 2.61). These increases in drinking levels did not significantly differ between intervention conditions compared to control. Thus, region of study did not moderate the relationship between intervention condition and drinking levels abroad.

***Alcohol-related consequences.*** While participants in the two region categories did not differ at pre-departure, Asia/Latin America, and non-traditional region participants significantly decreased their consequences from pre-departure at both first month abroad and last month abroad compared to Europe/Oceania participants. At first month abroad, participants studying in Europe/Oceania experienced consequences at a rate approximately 2.8 times more than participants in the other three regions, rate ratio = 2.83, confidence interval = 1.55 to 5.16, and at a similar rate approximately 2.8 times more at last month abroad, rate ratio = 2.80, confidence interval = 1.61 to 4.89. At first month abroad, there was a non-hypothesized significant interaction between region of study and PNF intervention condition, rate ratio = 0.33, confidence interval = 0.14 to 0.80, such that PNF participants in Asia, Latin America, and non-traditional regions experienced significantly more consequences at first month abroad compared to control

participants (see Figure 7, top). Europe/Oceania participants did not appear to experience significant intervention effects (i.e., intervention conditions versus control) at first month abroad. However, at last month abroad, there was a significant region X PNF + SAF interaction effect, rate ratio = 0.35, confidence interval = 0.13 to 0.96, such that Europe/Oceania participants in the PNF + SAF condition experienced significantly fewer consequences than control participants in these regions (see Figure 7, bottom).

**Legal drinking age status moderator.** We hypothesized that younger participants (i.e., those under the legal drinking age in the U.S. at pre-departure) would benefit most from the intervention conditions. Legal drinking age status was coded as “0” for under 21 years of age at pre-departure and “1” for 21 years or older at pre-departure. A chi-square test revealed there were no differences in variability of under 21 and 21 and over participants between each condition (51% under 21 in control condition, 51% under 21 in PNF, 44% under 21 in SAF, and 45% under 21 in PNF + SAF).

**Drinking.** Participants under the age of 21 in the control condition drank approximately 6.43 drinks per week at pre-departure. These participants significantly increased their rate of drinking at first month abroad by approximately 53% (approximately 9.84 drinks per week) at first month abroad and by 53% at last month abroad. Drinking at post-return did not significantly differ from pre-departure. There were no significant differences between participants under 21 and 21 or older on drinking nor were there intervention group X legal drinking age status interaction effects on drinking. Thus, legal drinking age status did not appear to moderate the relationship between intervention conditions and drinking.

**Alcohol-related consequences.** Participants did not significantly change alcohol-related consequences from pre-departure levels to any of the three follow-up points. There were no

significant differences between participants under 21 and 21 or older on alcohol-related consequences. Similarly, there were no intervention group X legal drinking age status interaction effects on drinking. Thus, legal drinking age status did not appear to moderate the relationship between intervention conditions and alcohol-related consequences.

**Summary of region or study and legal drinking age status moderation effects.**

Participants in Europe and Oceania reported increased rates of drinking and consequences compared to those in Asia, Latin America, and non-traditional regions. Region of study moderated the relationship between PNF and consequences and between PNF + SAF and consequences. Compared to controls in the same regions, PNF participants in Asia, Latin America, and non-traditional regions were at increased risk for consequences at the first month abroad, while PNF + SAF condition participants in Europe/Oceania were at less risk for consequences at last month abroad. Drinking significantly increased overall for participants under the legal drinking age at pre-departure, but this was not different from increases among those 21 or older. There were no moderation effects of legal drinking age status on intervention effects.

**Social reasons for drinking moderator.** We hypothesized that social reasons for drinking would moderate intervention effects especially for intervention conditions targeting peer/social influence (PNF and PNF + SAF) such that social drinkers in these intervention conditions would drink less and experience fewer consequences compared to control participants while abroad. Interaction effects that were significant at specific time points (i.e., pre-departure, first month abroad, last month abroad, post-return) were graphed with low values of this continuous variable specified as one standard deviation below the mean and high values specified as one standard deviation above the mean (Aiken & West, 1991).

***Drinking.*** A higher level of social reasons for drinking was predictive of drinking at pre-departure, rate ratio = 1.89, confidence interval = 1.57 to 2.27. At first month abroad, last month abroad, and post-return, social reasons for drinking assessed at pre-departure were predictive of decreased drinking rates (first month abroad, rate ratio = 0.65, confidence interval = 0.55 to 0.77; last month abroad, rate ratio = 0.68, confidence interval = 0.58 to 0.80; post-return, rate ratio = 0.83, confidence interval = 0.69 to 0.99). There was a significant social reasons X PNF interaction effect at first month abroad, rate ratio = 0.51, confidence interval = 1.17 to 1.94; last month abroad, rate ratio = 1.26, confidence interval = 0.98 to 1.62; and at post-return, rate ratio = 1.32, confidence interval = 1.01 to 1.73. Graphing these interactions revealed non-hypothesized effects for the PNF intervention, such that participants with low social reasons for drinking drank at lower levels in the PNF condition compared to the control conditions, while for first month abroad and post-return in particular, high social drinkers in the PNF condition reported the greatest amount of drinking at these time points (see Figure 8). For SAF, a similar pattern was found at first month abroad, such that SAF participants with higher reported social reasons for drinking drank the most (see Figure 9). For PNF + SAF, a similar pattern was found such that PNF + SAF participants with higher reported social reasons for drinking drank at the heaviest levels. There was a more pronounced difference between PNF + SAF and control participants with low social reasons for drinking, such that low social drinkers in the intervention condition drank the least while abroad (see Figure 10).

***Alcohol-related consequences.*** Social reasons for drinking at pre-departure significantly predicted a reduced rate of alcohol-related consequences at first month abroad, rate ratio = 0.75, confidence interval = 0.58 to 0.97 and last month abroad, rate ratio = 0.69, confidence interval = 0.55 to 0.88. After controlling for pre-departure social reasons for drinking, we found significant

intervention condition effects for PNF versus control and SAF versus control at last month abroad. Compared to control participants who increased their reported consequences by approximately 50% at last month abroad, PNF participants reduced their consequences by a rate of approximately 40% and SAF participants reduced their consequences by a rate of approximately 55%. Additionally, after controlling for pre-departure reasons, we found significant PNF + SAF intervention effects at post-return, such that compared to control participants who decreased their rate of consequences by 2% at post-return, PNF + SAF condition participants reduced their consequences from pre-departure levels by a rate of approximately 41%. There were no significant interaction effects between intervention conditions and social reasons for drinking at any time point. Thus, while after controlling for social reasons for drinking at pre-departure we found significant intervention effects at last month abroad, social reasons for drinking did not moderate the relationship between intervention conditions and alcohol-related consequences.

**Coping reasons for drinking moderator.** We hypothesized that coping reasons for drinking would moderate intervention effects especially for intervention conditions targeting the negative Sojourner Adjustment factor of homesickness/feeling out of place (SAF and PNF + SAF) such that coping drinkers in these intervention conditions would drink less and experience fewer consequences compared to control participants.

**Drinking.** Although coping reasons for drinking assessed at pre-departure significantly predicted greater drinking at pre-departure, rate ratio = 1.75, confidence interval = 1.28 to 2.40, coping reasons predicted less drinking at last month abroad, rate ratio = 0.70, confidence interval = 0.56 to 0.87. There were no significant interaction effects between coping reasons for drinking and intervention conditions at any time point.

***Alcohol-related consequences.*** Coping reasons for drinking were significantly predictive of alcohol-related consequences at pre-departure, rate ratio = 2.37, confidence interval = 1.61 to 3.48; and at post-return, rate ratio = 1.31, confidence interval = 1.01 to 1.75. Significant interaction effects emerged for coping reasons X SAF intervention condition at first month abroad, rate ratio = 0.61, confidence interval = 0.41 to 0.91; last month abroad, rate ratio = 0.61, confidence interval = 0.42 to 0.89; and post-return, rate ratio = 0.70, confidence interval = 0.47 to 1.03 ( $p = .07$ ; marginally significant). While SAF participants with low coping reasons experienced slightly more consequences compared to low coping control drinkers at first month abroad, last month abroad, and post-return, the most marked differences between conditions were evident between conditions among those with high coping reasons for drinking. Compared to control participants who reported high coping reasons for drinking, coping drinkers in the SAF condition experienced approximately 9% less consequences at first month abroad, 32% less consequences at last month abroad, and 18% less consequences at post-return (see Figure 11). Significant interaction effects between coping reasons X PNF + SAF also emerged at last month abroad, rate ratio = 0.68, confidence interval = 0.49 to 0.93, and at post-return, rate ratio = 0.56, confidence interval = 0.39 to 0.81. Similar to SAF effects, PNF + SAF condition participants who reported high coping reasons for drinking experienced consequences at a reduced rate compared to control coping drinkers (see Figure 12). Compared to high coping control drinkers, high coping PNF + SAF condition participants reported approximately 16% less consequences at last month abroad and 18% less consequences at post-return.

**Summary of reasons for drinking moderator effects.** Participants with higher reported social and coping reasons for drinking at pre-departure reported decreased rates of drinking and consequences during their study abroad trip. Compared to control participants with similar levels

of reported social reasons for drinking, the PNF intervention appeared to work best in terms of preventing heavier drinking for PNF low social drinkers at first month abroad, last month abroad, and post-return. However, there was an increased risk for drinking among high social drinkers in the PNF intervention compared to high social drinkers in the control condition at these time points. Similar non-hypothesized effects were found for high social drinkers in the SAF condition at first month abroad and for high social drinkers in the PNF + SAF conditions at last month abroad. Compared to control participants with similar levels of reported social reasons for drinking, the PNF + SAF intervention appeared to work best in terms of preventing heavier drinking for combined condition low social drinkers at last month abroad. Finally, compared to control participants with high levels of coping reasons for drinking, the SAF intervention appeared to work best at preventing consequences during the first month abroad, last month abroad, and post-return for high coping drinkers. SAF low coping drinkers increases consequences at first month abroad. The PNF + SAF intervention also appeared to work best at preventing consequences during the last month abroad and post-return among high coping drinkers.

**Closeness to region-specific study abroad peers exploratory analyses.** We hypothesized that those participants in PNF and PNF + SAF conditions reporting a greater amount of closeness to study abroad student peers in their region would drink less and experience fewer consequences than those with a lesser degree of closeness while abroad. We looked at the Inclusion of Other in the Self Scale responses from the post-return survey to determine how close participants felt toward their region-specific study abroad peers during their trip. As in prior analyses, interaction effects were graphed with low values of this continuous variable specified as one standard deviation below the mean and high values specified as one

standard deviation above the mean. As closeness to region-specific study abroad peers was assessed at post-return (after the intervention was delivered) it was not conceptualized as a moderator. Thus, the following effects and figures are interpreted as exploratory interactions. No conclusions about causality can be inferred.

***Drinking.*** A greater degree of closeness with region-specific study abroad peers was predictive of drinking at greater levels at pre-departure, rate ratio = 1.27, confidence interval = 1.07 to 1.50. Additionally, there was a significant closeness to peers X PNF + SAF condition interaction effect at pre-departure, rate ratio = 0.72, confidence interval = 0.56 to 0.90. Graphing this interaction revealed that control participants who reported a higher degree of closeness to study abroad peers reported the highest drinking at pre-departure (see Figure 13, top). There was a significant closeness to peers X PNF + SAF condition interaction effect at first month abroad, rate ratio = 1.25, confidence interval = 1.04 to 1.50, and at last month abroad, rate ratio = 1.23, confidence interval = 1.03 to 1.47. At first month abroad, high closeness to study abroad peers did not appear to have a large influence on drinking levels between control and PNF + SAF participants. However, PNF + SAF participants with a lower degree of closeness to study abroad peers reported greater drinking levels than control participants with lower levels of closeness (see Figure 13, middle). At last month abroad, closeness to study abroad peers moderated the PNF + SAF intervention effect in a hypothesized direction, such that PNF + SAF participants with higher levels of closeness to peers drank at lower levels compared to control participants who reported high closeness to peers (see Figure 13, bottom). Additionally at last month abroad, there was a significant closeness to peers X PNF interaction effect, rate ratio = 1.26, confidence interval = 1.04 to 1.53, such that PNF participants with higher levels of closeness to peers drank at lower levels during the last month abroad compared to control participants (see Figure 14).

Finally, with the inclusion of closeness to peers in the model, PNF main effects emerged at last month abroad. Relative to control participants, PNF participants drank approximately 33% less drinks during the last month abroad compared to control participants (7.21 drinks versus 10.76 drinks per week).

*Alcohol-related consequences.* A lower degree of closeness with region-specific study abroad peers was predictive of experiencing a greater rate of alcohol-related consequences during the last month abroad, rate ratio = 0.80, confidence interval = 0.68 to 0.94. At last month abroad, there was a significant closeness to peers X PNF + SAF condition effect, rate ratio = 1.39, confidence interval = 1.1 to 1.76, such that those with a higher degree of closeness in the PNF + SAF condition experienced fewer consequences than control participants with a higher degree of closeness (see Figure 15, top). At post-return, there was also a significant closeness to peers X PNF + SAF condition effect, rate ratio = 1.50, confidence interval = 1.16 to 1.93, with a similar but less dramatic effect such that those with a higher degree of closeness in the PNF + SAF condition experienced fewer consequences than control participants with a higher degree of closeness (see Figure 15, bottom). Also, at post-return, there was a main effect for closeness with region-specific peers such that greater reported closeness with peers was predictive of less drinking at post-return, rate ratio = 0.83, confidence interval = 0.70 to 0.99. There were also significant effects for SAF condition participants at last month abroad. With the inclusion of the closeness to region-specific peers as a moderator in analyses, SAF participants experienced consequences at a rate of 37% fewer consequences compared to control participants (1.72 mean RAPI score versus 2.73 for control). There was a significant closeness to peers X PNF + SAF condition effect, rate ratio = 1.39, confidence interval = 1.10 to 1.76, such that participants in the SAF intervention with lower closeness to peers experienced fewer consequences than control

participants with lower closeness to peers during the last month abroad (see Figure 16).

**Closeness to country-specific host nationals exploratory analyses.** We hypothesized that those participants in PNF and PNF + SAF conditions reporting a greater amount of closeness to nationals in their country of study would drink less and experience fewer consequences than those with a lesser degree of closeness. We looked at the Inclusion of Other in the Self Scale responses from the post-return survey to determine how close participants felt toward their country-specific host nationals during their trip. Again, these analyses are interpreted as exploratory interaction effects without assumptions of causality.

***Drinking.*** Contrary to hypotheses, a greater degree of reported closeness to local people from one's study abroad site was predictive of increased drinking levels at first month abroad, rate ratio = 1.24, confidence interval = 1.08 to 1.43, and at last month abroad, rate ratio = 1.20, confidence interval = 1.05 to 1.37. There were no significant closeness to nationals X intervention condition effects. Thus, closeness to country-specific host nationals did not appear to moderate the relationship between intervention conditions on drinking.

***Alcohol-related consequences.*** Contrary to hypotheses, we found no significant main or interaction effects for closeness to country-specific host nationals regarding alcohol-related consequences. Thus, closeness to country-specific host nationals did not appear to moderate the relationship between intervention conditions on alcohol-related consequences.

**Summary of closeness to peer and host national exploratory analyses.** Lower closeness to study abroad peers predicted greater experience of consequences at last month abroad, while greater closeness to host nationals predicted increased drinking at first month abroad and last month abroad. Compared to control participants with low closeness to study abroad peers, PNF + SAF participants reported increased risk for drinking at first and last month

abroad. However, compared to control participants with high closeness to study abroad peers, PNF and combined PNF + SAF intervention condition participants reported decreased risk for drinking at last month abroad. Additionally, compared to control participants with high closeness to study abroad peers, PNF + SAF with high closeness to peers reported decreased risk for consequences at last month abroad and post-return. SAF participants with low closeness to study abroad peers also reported a decreased risk for consequences at last month abroad compared to controls.

## Discussion

The present research project aimed to broaden the reach of alcohol interventions to targeted groups at-risk for heavy and problematic alcohol use within foreign environments. This research also addressed the public health concern of problematic drinking among an at-risk population lacking empirically supported intervention. Study abroad students represent a population at-risk for increased and problematic drinking. Despite documentation of these risks (e.g., Hummer et al., 2010; Pedersen et al., 2009; 2010b) and awareness of the problems associated with student drinking (Epstein & Rhodes, 2000; Forum on Education Abroad, 2008), study abroad program personnel and student affairs staff at institutions of higher learning have limited or no developed and efficacious approaches for targeting drinking and consequences among students while abroad (Epstein, 2005). Thus, the present study was designed to address this gap in both clinical research and university needs. Utilizing prior research to inform intervention content, these brief web-based interventions targeting established risk (misperceived drinking norms; PNF) and protective factors (positive Sojourner Adjustment; SAF) aimed to prevent increased and problematic drinking for students while abroad and address already established patterns of use among this self-selecting heavier drinking group.

Hypothesized main effects for the intervention emerged during participants' last month abroad. Specifically, SAF and PNF participants reported a reduced rate of alcohol-related consequences during the last month abroad compared to control participants. Additionally, a non-hypothesized effect for SAF on increased drinking during the first month abroad emerged. There were no observable differences in mean drinking or alcohol-related consequences for combined PNF + SAF intervention participants. There were also no significant effects between PNF + SAF intervention participants and single SAF or PNF intervention participants. Thus, the

combined intervention did not appear to impact drinking rates and consequences as hypothesized. Recent evidence suggests that briefer interventions may be more impactful on reduced drinking than longer interventions of similar content (Kulesza, Apperson, Larimer, & Copeland, 2010; Lostutter, 2010). Thus, perhaps the combined intervention contained more content than was necessary. Perhaps reduced length of single intervention conditions and greater focus on one theme (i.e., norms or Sojourner Adjustment) was preferred by participants and contributed to better absorption of intervention content.

The primary effects on alcohol-related consequences observed at last month abroad rather than first month abroad can possibly be attributed to participants needing a normal time period of adjustment to life abroad before experiencing intervention effects on consequences. That is, the first month abroad may be marked by a large increase in drinking as students attempt to make friends and learn about their environment. The increases in total weekly drinks may have been attributed to increased frequency of drinking (e.g., 2 weekend days per week at college to near-daily moderate drinking) rather than increased quantity. In fact, post-hoc estimations of means revealed that the increase at first month abroad for SAF participants was driven by frequency, with SAF participants reporting a near 1.5 day increase in frequency, but only an increase of one-tenth of an average drink per occasion. Hummer and colleagues' (2010) found that frequency, not quantity, increased from pre-departure levels for students; however, the average quantity consumed while abroad demonstrated a unique impact on alcohol-related general and sexual risk consequences while abroad. Thus, although drinking frequency may have increased initially among those in the SAF condition, it apparently did not impact students enough for them to experience substantial alcohol-related consequences. The SAF intervention possibly helped these students engage their environment through activities that may have led to increased frequency of

drinking (e.g., wine tasting events, drinking at dinner with local people), but students may have utilized the information presented in the intervention to continue drinking at a responsible or moderate level during drinking occasions; focusing on cultural engagement rather than on partying with friends.

We hypothesized that SAF intervention participants may have experienced a reduced rate of alcohol-related consequences due to increased engagement in positive Sojourner Adjustment and limited experience with negative Sojourner Adjustment. We did not, however, find that Sojourner Adjustment mediated the intervention effects on drinking or alcohol-related consequences. However, exploratory analyses revealed that SAF participants who reported higher levels of negative Sojourner Adjustment factors over the entire trip (social interaction with co-nationals, homesickness/feeling out of place) reported a reduced rate of alcohol-related consequences than control participants. Thus, it may be that participants who experienced these negative factors did not respond to them by drinking heavily or experiencing consequences if they had received the SAF intervention.

Control participants who reported greater language development and use reported greater rates of alcohol-related consequences; however this was not the case for those participants who received PNF. Thus, participants who received the drinking norms-focused intervention may have engaged their environment through language use but recognized that peers and local people were not drinking as heavily as they may have previously perceived. Similarly, cultural understanding and participation predicted increased risk for consequences, but this was more evident among control participants than among SAF participants. This positive Sojourner Adjustment factor has been found to predict consequences in our previous work (Pedersen et al., 2011d), however it correlates with other positive Sojourner Adjustment factors that prevent

alcohol risk (Pedersen et al., 2011c). Thus, it may be that this positive aspect of Sojourner Adjustment (“gain insight,” “enhance understanding,” “actively learn about customs and traditions,” and “develop one’s own perspective of the country”) is an inevitable experience that students have simply by being abroad in a foreign country. However, this process may interact with other positive Sojourner Adjustment processes to reduce risk. This is supported by the observed effects of the SAF intervention on consequences. The idea that Sojourner Adjustment factors interact to predict or prevent risk is an area of future research.

The marginally significant effects for PNF on reduced rates of alcohol-related consequences compared to control at last month abroad were hypothesized to be mediated by changes in perceptions of region-specific peer norms and of country-specific host national norms. While PNF participants reported lower perceptions of region-specific peer norms over time, as well as increases in perceived abstinence rates of host nationals, these effects did not mediate the relationship between the PNF intervention and consequences. Interestingly, decreases in perceived abstinence rates of host nationals over time (i.e., they believed their country had more drinkers in it once they went abroad) mediated the effect of the SAF intervention on increased drinking during the first month abroad. This suggests that students may have been influenced by the SAF intervention to engage their environment (e.g., talking with local people, exploring cultural activities) and been in situations where they could observe the drinking behavior of local people. Thus, they may have been influenced to increase drinking and report higher norms of behavior based on these observations, which were no doubt more outwardly observable and attended to than non-drinking behaviors (Bandura, 1977). However, once students spent more time in the environment they may have learned that while many people consume alcohol, drinking lightly or moderately is the norm. They therefore may have been

influenced to match the drinking behaviors of their environment at this later time period. Prior work supports this idea, such that students who believed host national drinking was heavy in their environment and who also reported limited assimilation into the culture were at greater risk for drinking increases (Pedersen et al. 2011a). The more assimilated students with equally high normative perceptions drank at a comparatively reduced rate. Thus, these students may drink more moderately and limit their experience of alcohol-related consequences over time as evident by the SAF condition participants reporting reduced consequences during the last month abroad.

Evaluated moderators of intervention effects on drinking and alcohol-related consequences included region of study, age at pre-departure, social reasons for drinking, and coping reasons for drinking. The region of study moderator was examined by comparing participants who studied in Europe and Oceania (i.e., heavier drinking regions based on previous research) to those who studied in other world regions (i.e., Asia, Latin America, non-traditional study abroad locations in the Middle East, Africa, South Asia, and West Asia). Consistent with previous findings (Hummer et al. 2010; Pedersen et al., 2010b), Europe/Oceania participants increased their drinking at a greater rate over time than participants in other world regions. These participants also reported greater rates of consequences abroad compared to participants in Asia/Latin America/non-traditional regions. While there was a non-hypothesized effect of increased consequences among PNF participants in the other world regions category (Asia, Latin America, non-traditional study abroad locations) compared to other countries in the control condition at first month abroad, combined PNF + SAF Europe/Oceania condition participants experienced a reduced rate of consequences at last month compared to controls. One potential reason for the non-hypothesized increase among the other world regions category may relate to the variability among the countries in this region. That is, not all the heavier drinking countries

are contained in Europe or Oceania (WHO, 2004) and students in heavier drinking regions may have discounted the normative evidence presented if the region-specific information was much lower than the country-specific content presented. It is possible that once participants engaged their environment and tested these newly learned perceptions in the environment they were less likely to engage in problematic drinking during the latter months abroad. Thus, as discussed earlier, it may take time for SAF to take effect and may uniquely combine with the PNF to reduce risk for consequences among those students in heavier drinking regions.

Contrary to previous findings (Pedersen et al., 2010b), participants who were under the legal drinking age at the time of departure did not report increased drinking while abroad at a greater extent compared to those 21 or older. There were no observable changes over time for alcohol-related consequences and contrary to hypotheses, those in the intervention conditions under the legal U.S. drinking age at pre-departure did not appear to drink less or experience less consequences compared to control participants nor those over the age of 21. Thus, there were no moderation effects of legal drinking age status.

Reasons for drinking moderation analyses revealed that participants in all three intervention conditions (PNF, SAF, PNF + SAF) who reported greater social reasons for drinking at pre-departure drank at heavier levels abroad than control participants with high social reasons for drinking. These non-hypothesized effects were puzzling. It is possible that those more focused on social facilitation with study abroad peers drank socially to meet friends and then found healthier ways to engage their environment and local people during the latter months. This again fits with the idea that the intervention effects may have taken time to generate an effect and a natural process of adjustment needed to take place before intervention content was utilized by students. However, the behavior of highly social drinkers may have been particularly

difficult to change through the intervention. Social networks may be chosen based on one's own personality traits (Robins, Elliott, & Pattison, 2001) and heavier social drinkers may choose friends in college who share similar risks for drinking in college (e.g., male sex, sensation seeking) (Kahler, Read, Wood, & Palfai, 2003). Thus, heavier social drinkers may have chosen heavier drinking friends during the initial weeks abroad, which in turn influenced them to continue drinking heavily within the new environment (Read, Wood, & Capone, 2004). It should also be noted that intervention participants with lower social reasons for drinking drank at lower rates than controls. Thus, the interventions may have worked particularly well for less social drinkers. Fitting with this idea, while participants with higher reported coping reasons for drinking drank less over time, those in the intervention conditions containing a focus on homesickness/feeling out of place (i.e., SAF, PNF + SAF) reported reduced rates of consequences during the abroad trip compared to control participants. This is encouraging given that study abroad personnel have reported that targeting "culture shock" during pre-departure interventions may help students better adjust to life abroad and reduce risk for negative experiences (Black & Mendenhall, 1990; Brislin & Kim, 2003; Winkelman, 1994). Additionally, coping reasons for drinking are more likely to associate with longer term problematic and heavy drinking patterns as individuals learn to deal with life's stressors by "self-medicating" (Carey & Correia, 1997; Cooper, Frone, Russell, & Mudar, 1995; Hasking, 2006). Pedersen and colleagues (2011d) found that coping drinkers who reported less social interaction with host nationals and less host culture identification (two positive Sojourner Adjustment factors) were most at risk for consequences. The SAF intervention may have prevented some of these effects among established coping drinkers by promoting engagement with local people and increasing a sense of identification with environment.

Exploratory analyses also revealed that there was a reduced risk for consequences among SAF participants who reported less connection with their peers. Thus, these SAF intervention students who felt less connected to their peers abroad may have engaged their environment by exploring on their own, meeting local people, and studying culture in ways that were more solitary rather than collective. This is something study abroad students apparently strive for but unfortunately find hard to achieve (Citron, 1996; Pitts, 2009). There was also a reduced risk for consequences abroad for participants in the combined PNF + SAF group who reported greater connection with their peers while abroad. These participants may have engaged the culture in groups but utilized the knowledge they gained from the PNF that their peers did not drink as much as they may have perceived. Indeed the least risk for heavy drinking abroad was evident among students who perceived the norm of their peers as low and who placed less emphasis on their home culture (compared to the host culture) while abroad (Pedersen et al., 2011a). There was also a reduced rate of drinking among PNF participants who felt closer to their study abroad peers, which fits with theory that norms-based interventions will work better when information presented is based on salient, tight-knit reference groups (Festinger 1954; Latane, 1981). Regarding host nationals, a greater degree of closeness to hosts nationals predicted increased drinking over the trip. However, there was no impact of this factor on consequences. This again supports the idea that drinking moderately with local people may not be particularly problematic, but there were no differences in closeness to host nationals among intervention groups to make any inferences about intervention effects.

It should be noted that it is unknown whether many of the participants actually viewed the feedback presented. While we attempted to ask participants whether they viewed the feedback or not, only half of participants responded to this survey. As this survey was presented

at the end of the feedback, it is possible that participants who did not view the feedback never saw the link to the post-feedback questionnaire. Thus, almost half of the participants may never have viewed the feedback. However, for those who reportedly did view the feedback, it was encouraging to report that participants spent more time viewing feedback that was longer in content. That is, PNF participants reported the least amount of time viewing the feedback, followed by the SAF participants and then the PNF + SAF participants. Also encouraging is the report that half of participants who filled out the post-feedback questionnaire reported intention to view the feedback again. Despite this, online social norms interventions will likely not work if participants are not viewing the intervention content. Thus, several important factors can be considered in future research. It may be important for students to complete the surveys and view the feedback in laboratory settings to ensure participants are at least reading through the feedback once. We emailed participants an online link to their feedback, but perhaps emailing students a PDF of their feedback (to have access to the feedback even without Internet connection) or mailing participants a hard copy of their feedback would be preferable. Additionally, while Internet-based approaches are preferred by students (Kypri, Saunders, & Gallagher, 2003) and have a host of benefits (Moore, Soderquist, & Werch, 2005; Saitz et al., 2007; Stretcher, 2007; Zisseron, Palfai, & Saitz, 2007), it will important for researchers to examine this intervention design compared to norms and Sojourner Adjustment-focused in-person interventions. There are in-person college student interventions with strong empirical support (e.g., Brief Alcohol Screening and Intervention for College Students; Dimeff, Baef, Kivlahan, & Marlatt, 1999) and providing students with these interventions prior to or during study abroad trips may also be helpful. Given that the intervention effects on consequences did

not emerge until the last month abroad after a spike in drinking at the first month, it may be important to provide online or in-person “booster sessions” during the first month abroad.

## **Limitations**

Sample-related and methodological limitations existed in the study. One primary limitation is the use of self-report measures collected via the Internet, which could be associated with self-report bias. However, research suggests confidential surveys enhance reliability and validity of self-report (Babor & Higgins, 2000; Babor, Stephens, & Marlatt, 1987; Chermak, Singer, & Beresford, 1998, Darke, 1998) and response rates are higher for web than mailed surveys (McCabe, Couper, Cranford, & Boyd, 2006). Participants may be more comfortable reporting on illegal or socially undesirable behaviors in the absence of an interviewer using online methods (Pedersen, Grow, Duncan, Neighbors, & Larimer, 2011b; Turner et al., 1998).

**Sample-related limitations.** One sample-related limitation of note was the higher prevalence of female participants in the sample. While women have traditionally outnumbered males in study abroad programs by a ratio of 2:1 (Desoff, 2006; Thomas & McMahon, 1998), most recent data from the 2008/2009 academic year suggests 64% of study abroad students are female. Thus, the sample in this study contained disproportionate numbers of female participants compare to national study abroad student statistics (IIE, 2010). Additionally, the study sample was more ethnically diverse than national samples, which contributes to necessary research with ethnic minority students, but may limit the generalizability of these results to a national scale. While the vast majority of study abroad students are White (81%; IIE, 2010), comparable proportions of African-American, Hispanic/Latino(a), and White students intend to study abroad in college (Salisbury, Umbach, Paulsen, & Pascarella, 2009). This imbalance between intentions

and actual completion of trips warrants further investigation in educational and psychological research studies.

Additionally, data was collected from only one site in the Pacific Northwest. While the recruitment and data collection techniques yielded similar demographics to typical study abroad students at the university and adequate retention rates, these findings may not be generalizable to students in other regions of the U.S. or to smaller liberal arts colleges. Many colleges strongly encourage study abroad opportunities and may even require them for some majors. A sample of students required to complete study abroad opportunities may differ greatly from our volunteer sample. Our retention rates were encouraging and suggest that online data collection from Americans abroad can be successful. However, it is unknown if those who failed to complete follow-up surveys did so because of limited Internet access in more rural site locations. As access to the Internet grows throughout the world (Internet World Stats, 2009), it is possible that retention rates can be increased even more. Modified follow-up strategies for surveys can include even briefer surveys participants can complete in less than 5 minutes or from a Smart Phone.

Finally, we recruited a large selection of study abroad students but only invited participants who were studying abroad for approximately three months. It became clear after study design was finalized that nearly 60% of the participants who did not meet our screening criteria failed to be invited because they were studying abroad for approximately one month. These brief trips abroad are becoming increasingly popular (IIE, 2011) and may promote even greater risk for drinking and consequences. Individuals may not have enough time to engage their environment and see this as a “month-long time-out.” Research with spring break participants (approximately one-week trips) and individuals participating in Mardi Gras events in New Orleans suggests these time-out periods or “backspace” locations are viewed as areas where

deviant behavior is acceptable, normative, and is free from reproach or consequence (Jankowiak & White, 1999; Redmon, 2003a). An application of Social Control Theory (Hirschi, 2002) to drinking within these environments suggests that individuals may behave in deviant ways inconsistent with their personality if they do not feel connected to the environment (Redmon, 2002; 2003b). “Situational disinhibition” may occur in temporary environments such as these (Maticka-Tyndale, Herold, & Oppermann, 2003) and individuals actually report that these situations do not feel “like real-life” (Redmon, 2003a). It may be difficult to intervene using the Sojourner Adjustment feedback utilized in this study, but it is clear this may be a sub-group of study abroad students warranting future research attention. Finding ways to engage the culture even within a brief time period can possibly help students increase connection to the environment and prevent negative drinking incidents.

**Methodological limitations.** Several methodological limitations were related to the design of the intervention. First, the personalized feedback (especially the SAF) was very text heavy. As displayed in Appendices II and III, participants needed to read several pages of text in the intervention conditions. Additionally, participants needed to click on the provided links in order to maximize their experience with the content. For example, if participants never clicked on the link provided on the language and development page, they would not have had the opportunity to benefit from the language translation program. Additionally, while participants were sent the personalized feedback one week into their trip with the hope this would provide them with easy access to the content, it is unknown if participants continued to review the material. Using this same example, participants could have likely benefitted from continuing to use the online language translator if accessed often while abroad; however, it is unknown if participants clicked on this link once or continued to use it at a near-daily level. Perhaps the

length and text-heavy content of the interventions can help explain why we failed to find a significant PNF + SAF effect. It is possible students simply did not read the information contained. Results that only half of the participants kept the link to review later and that participants only spent approximately six and a half minutes reviewing the feedback provides support for this idea.

While the content for the PNF was developed based on theory and empirical research, the content also was informed by the available data we had for study abroad peers and host national referents. As noted, due to small N in each country obtained in the documentation of study abroad peer drinking norms, PNF content was based on region-specific peer referents. Information from country-specific referents would have added an additional level of salience which could possibly have made the intervention content more meaningful to participants (Latane, 1981; Lewis et al., 2007). However, region-specific referents added a greater level of salience as opposed to “study abroad students in all world regions.” Additionally, the PNF content for the host nationals was informed by the available statistics from the World Health Organization’s (WHO) Global Status Report in 2004. This report utilized the available data on drinking rates in each of the countries targeted in the PNF. However, due to the limited standardization of measures across different countries, it proved difficult to design an intervention that had consistent and similar content to present to students for their host country. Also, it would have been ideal if host national content could mirror region-specific study abroad referent data (i.e., drinks per week consumed by a student in the host region, average drinks consumed per occasion by a student in the host region). The one consistent statistic that emerged was the “percentage of abstainers” in each country. Thus, this statistic was targeted in the country-specific host national drinking feedback. We were also able to obtain the adult yearly

per capita drinking rates for each country and used this statistic to create an estimated “drinks per week” variable for adults in each country. This estimate of behavior likely would have differed from the values obtained had we been able to give a DDQ questionnaire to samples of adults in each country. Thus, this value should be interpreted as an estimate. Participants were provided on the PNF with a description of how the drinks per week variable was calculated (see Appendix II). Additionally, students had the opportunity to click a link to the country-specific WHO Report from 2004 and review the country-specific drinking data available.

Finally, there are countless interesting variables that could potentially predict changes in drinking and problems over time or moderate intervention efficacy; however, effort was made to keep the questionnaires as brief as possible to encourage continued participation. In addition, moderators included in this study were based on prior work with study abroad students and on theoretical rationale for increased and problematic behavior during the study abroad trip. Future exploratory moderators of interest include location of study abroad program (e.g., rural versus urban settings), ethnicity/nationality (e.g., students studying in countries where their parents/ancestors originated from), expectations of the study abroad experience (e.g., belief the program will expand one’s worldview), sensation seeking or other personality factors, major area of study, and drinker type (e.g., light versus heavy drinker). Gender was not included as a moderator of intervention efficacy due to prior research revealing no gender differences for increased drinking while abroad (Hummer et al., 2010; Pedersen et al., 2009c). As discussed, due to the large number of different countries students live in while abroad, region of study was chosen as a moderator rather than country of study. This variable likely did not fully capture the diversity of drinking within specific countries. Future research with larger and diverse samples utilizing this intervention design can examine these and other moderators of interest.

## **Future Directions**

This research represents a first step in a novel area with at-risk young adult populations that currently lack empirically supported interventions targeting risky health behaviors. The moderate effects observed for PNF and SAF interventions in this pilot study suggest that future work with larger and more diverse samples is warranted. Researchers can examine the same intervention design with students from different regions of the U.S. or can determine if in-person delivery of intervention content in group formats is equally or more efficacious compared to the online delivery of content. As research with study abroad students is nascent, it is important to expand understanding of the mechanisms behind increased and problematic drinking abroad so we can continue to design efficacious interventions. As most universities and colleges do not have empirically-supported pre-departure prevention programs for these students but find alcohol use abroad concerning (Epstein, 2005; Forum on Education Abroad, 2008), it will be especially important to inform Study Abroad Office personnel and university administration of the research findings resulting from these studies.

The use of brief online pre-departure interventions promoting engagement and participation in the host culture through positive Sojourner Adjustment and correcting overestimations of peer and native adult drinking within the host country can be utilized in future work with American study abroad students and with other various groups during transitions to new environments/cultures (e.g., international students, foreign aid workers, travelers, military personnel). This alcohol-specific intervention can possibly be adapted to prevent/reduce other risky behaviors among these groups; such as risky sex and HIV/AIDS prevention among international travelers and foreign aid workers (Hawkes et al., 1984; Moore, Beeker, Harrison, Eng, & Doll, 1995) and cigarette smoking and drug use initiated during active duty for military

personnel (Bray et al., 2006). While notable differences exist between American college students studying abroad and these other groups, similarities are evident. These include acceptance and influence from peers, increased independence and unstructured time, underdeveloped neurological and cognitive functioning related to engagement in risky behavior, sensation seeking personality characteristics, developmental processes related to identity exploration and relationship pursuit, and difficulties with transitions to life away from familiar family, friends, and environments (Baer, 2002; Brown et al., 2008; Church, 1982; Erikson, 1968; Masten, Faden, Zucker, & Spear, 2009; National Institute of Alcohol Abuse and Alcoholism, 2006). Examination of the risk and protective factors specific to other groups transitioning to life abroad can help inform future prevention of alcohol and other risk behaviors. Pre-departure interventions with these groups in accessible and relevant formats that utilize groups-specific risk and protective factors can help prevent increased and problematic behavior during transitions to new environments.

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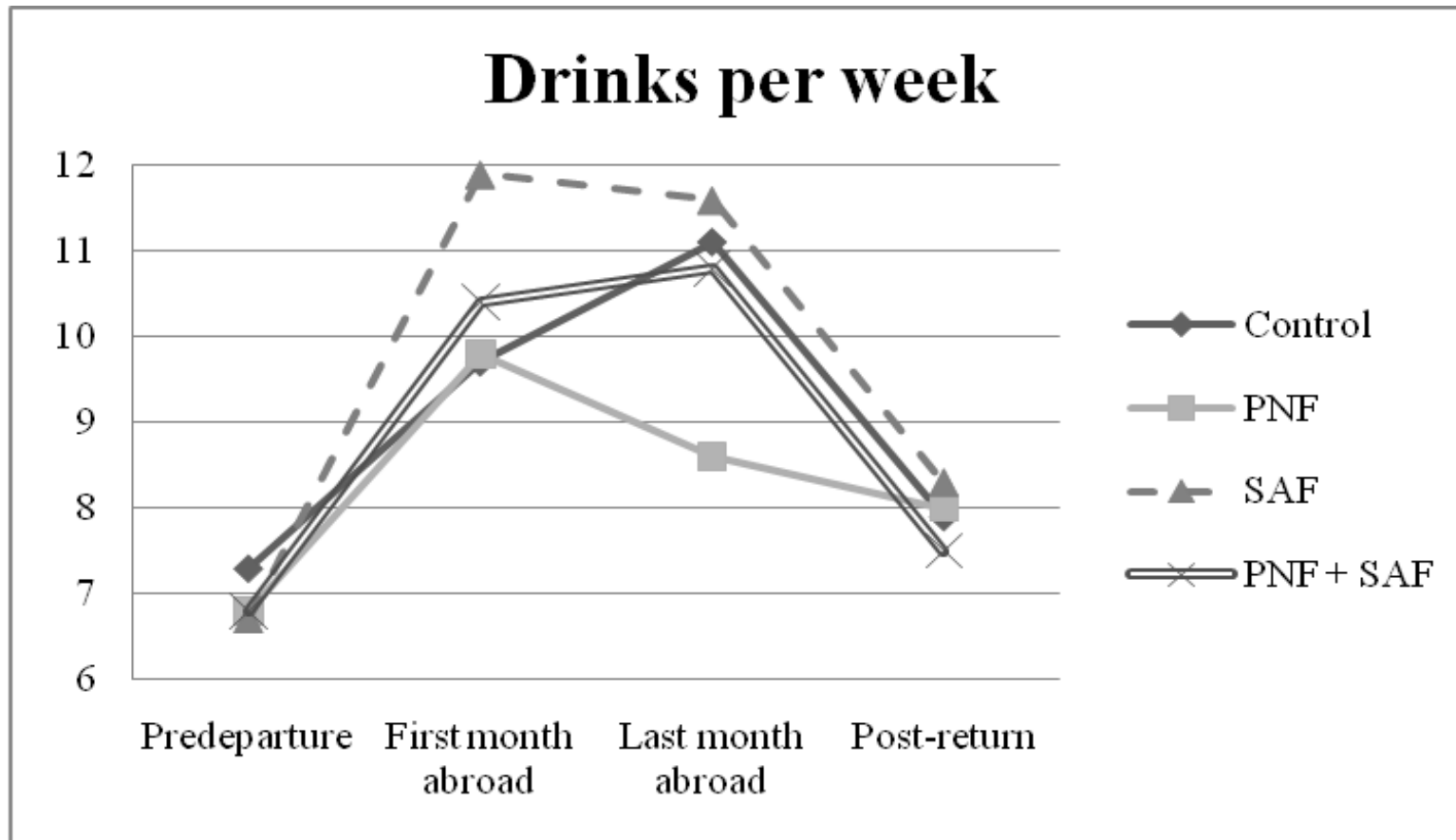


Figure 1. Changes in estimated mean drinking over time by condition.

Note: Graph does not begin with zero values to enhance readability of trend lines.

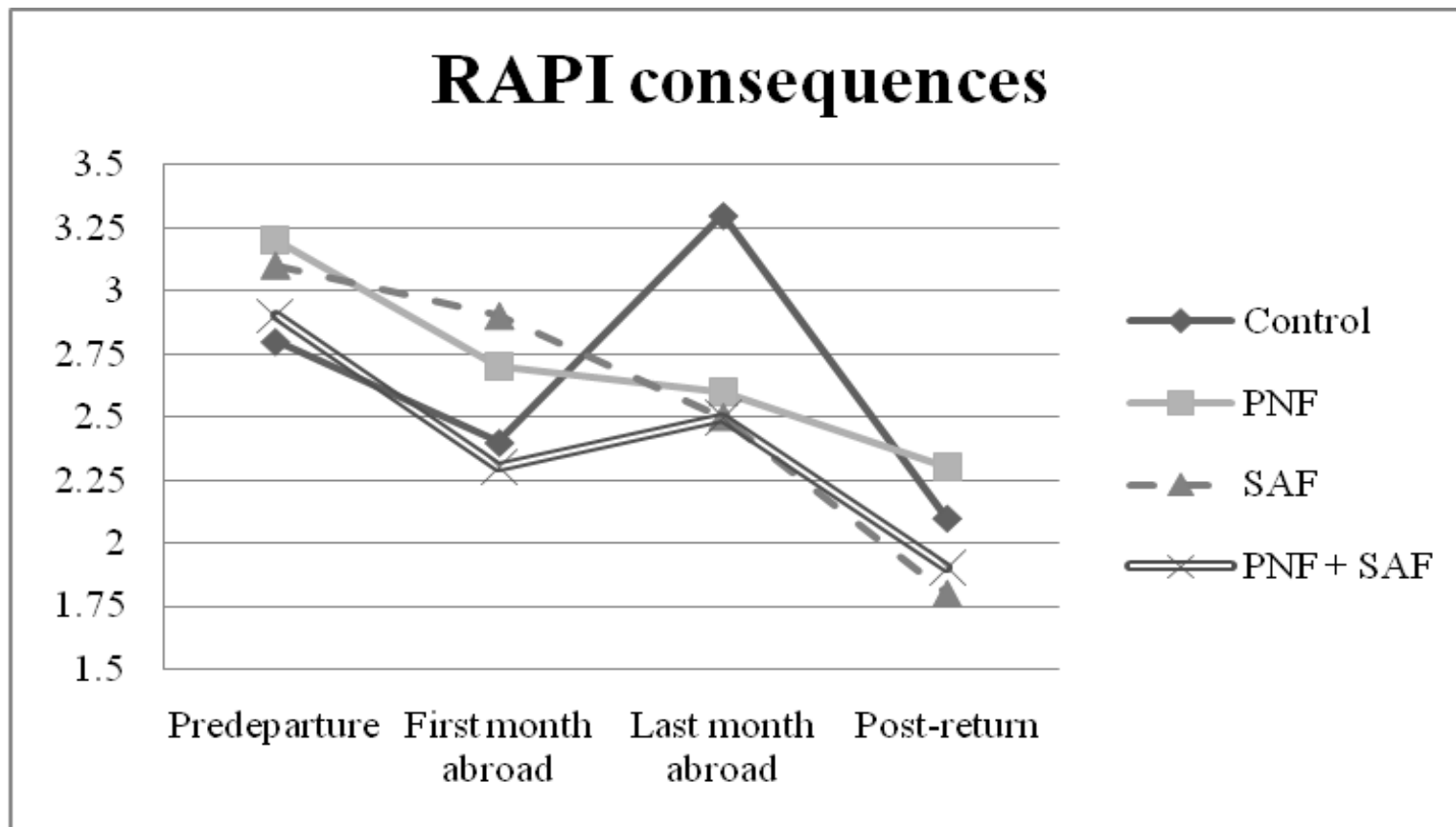


Figure 2. Changes in estimated mean alcohol-related consequences over time by condition.

Note: Graph does not begin with zero values to enhance readability of trend lines.

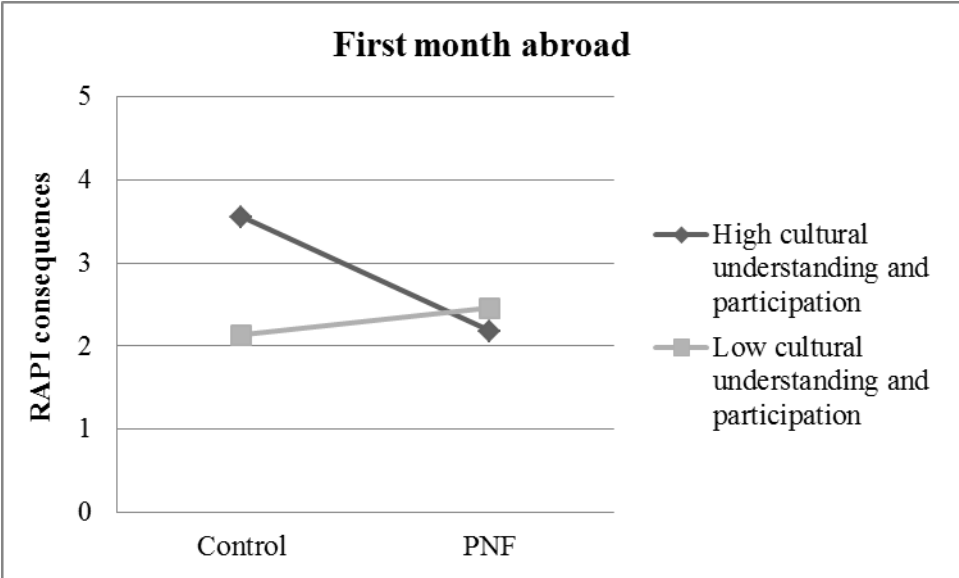
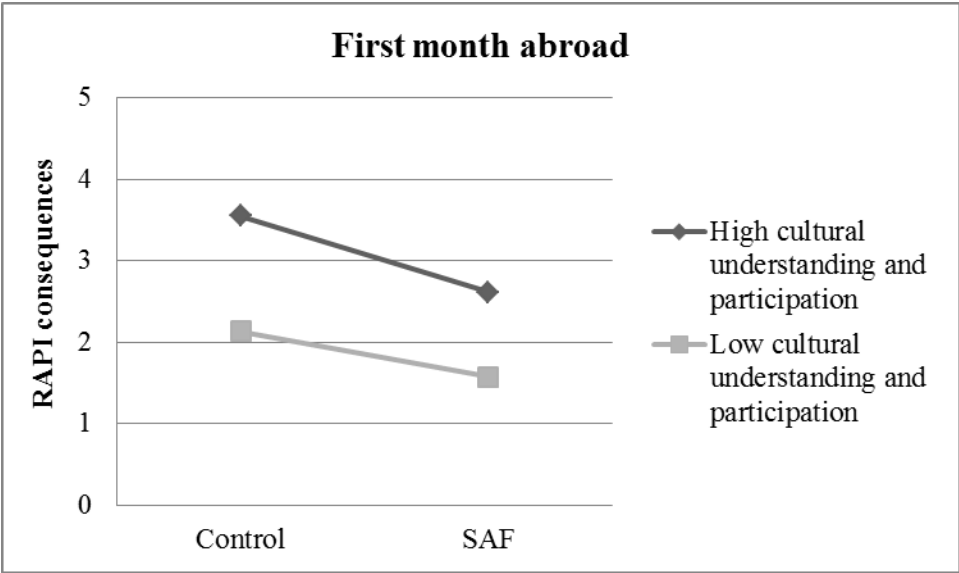


Figure 3. Cultural understanding and participation by SAF and PNF interactions predicting alcohol-related consequences at first month abroad.

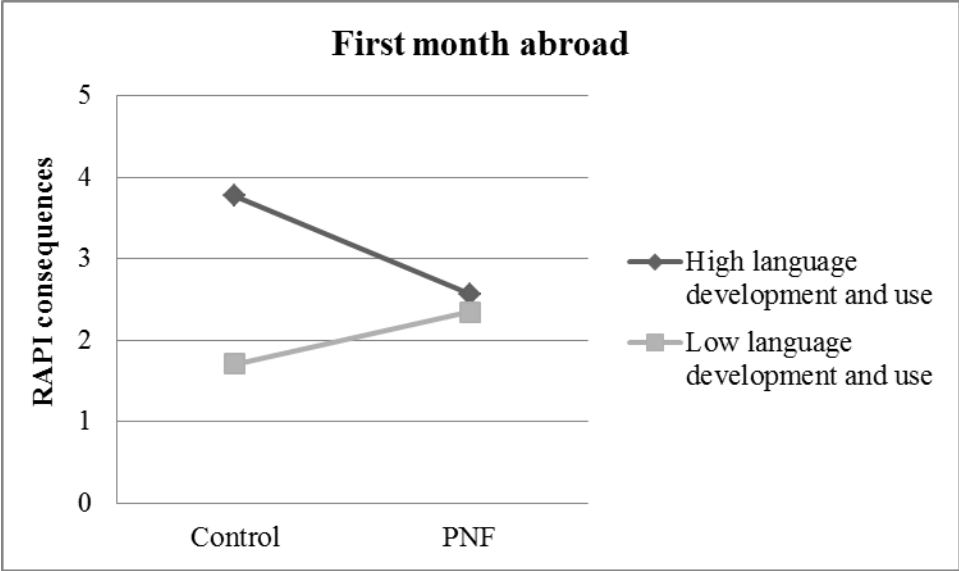


Figure 4. Language development and use by PNF interaction predicting alcohol-related consequences at first month abroad.

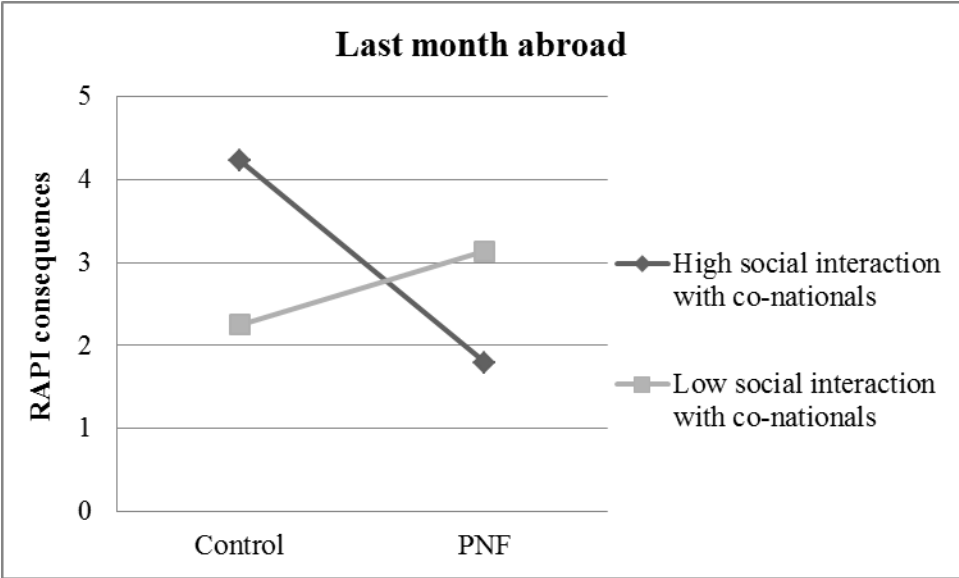
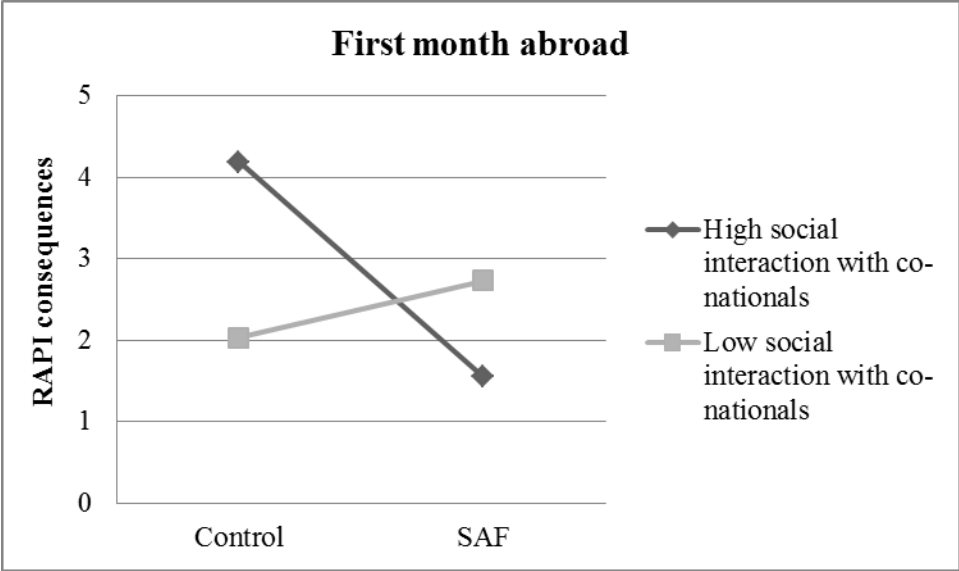


Figure 5. Social interaction with co-nationals by SAF and PNF interactions predicting alcohol-related consequences at first month abroad and last month abroad.

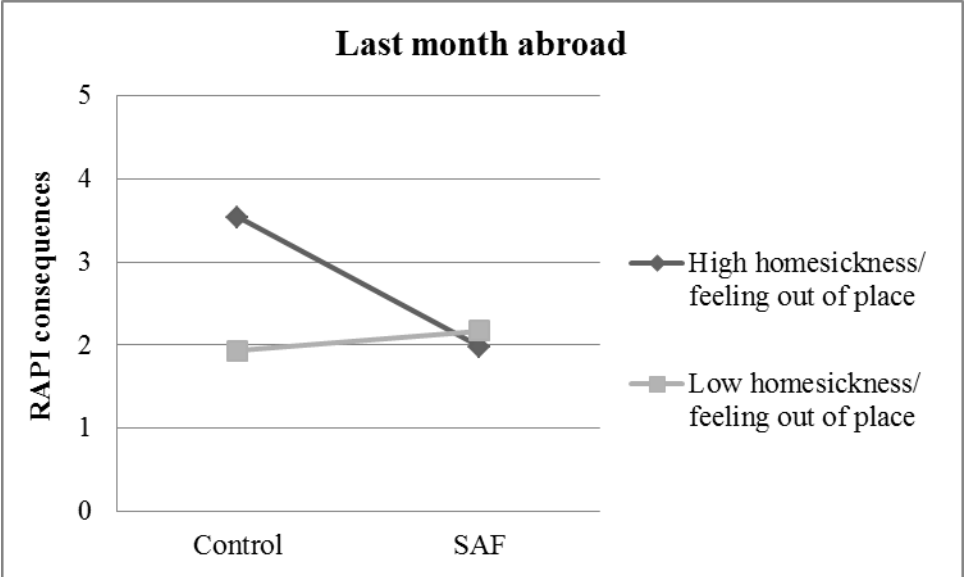
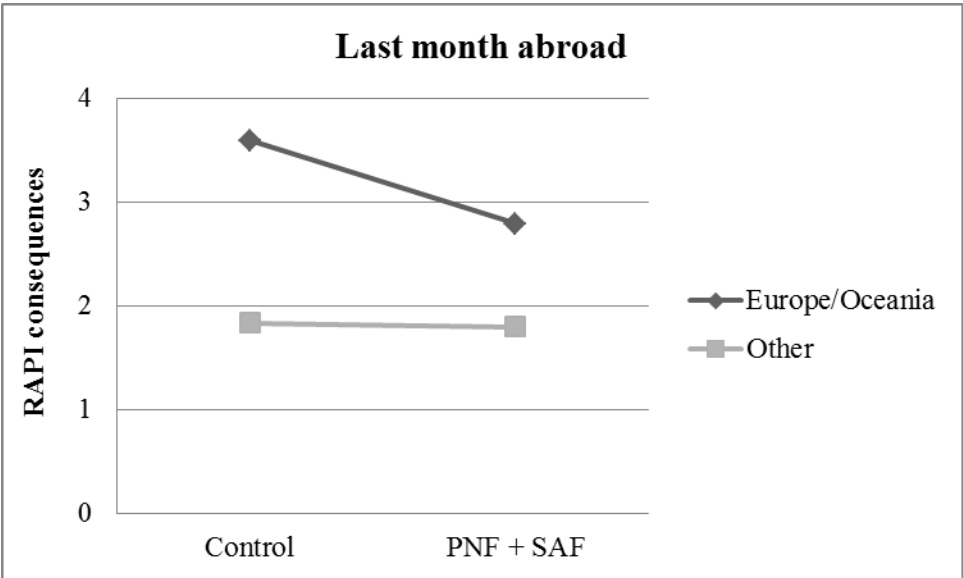
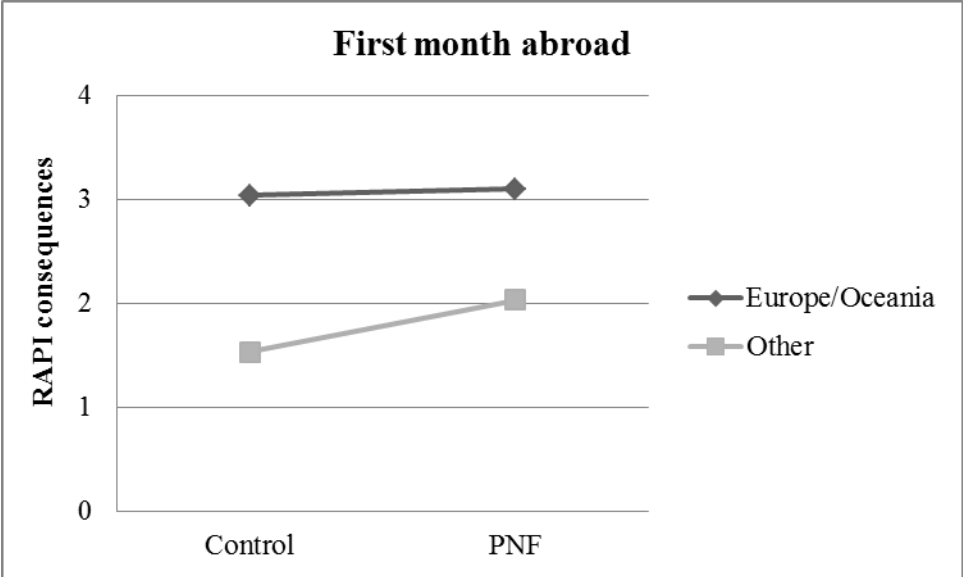


Figure 6. Homesickness/feeling out of place by SAF interaction predicting alcohol-related consequences at last month abroad.



Note: “Other” region contains participants studying abroad in countries in Asia, Latin America, and non-traditional study abroad sites in in the Middle East, Africa, South Asia, and West Asia.

Figure 7. Region of study moderator.

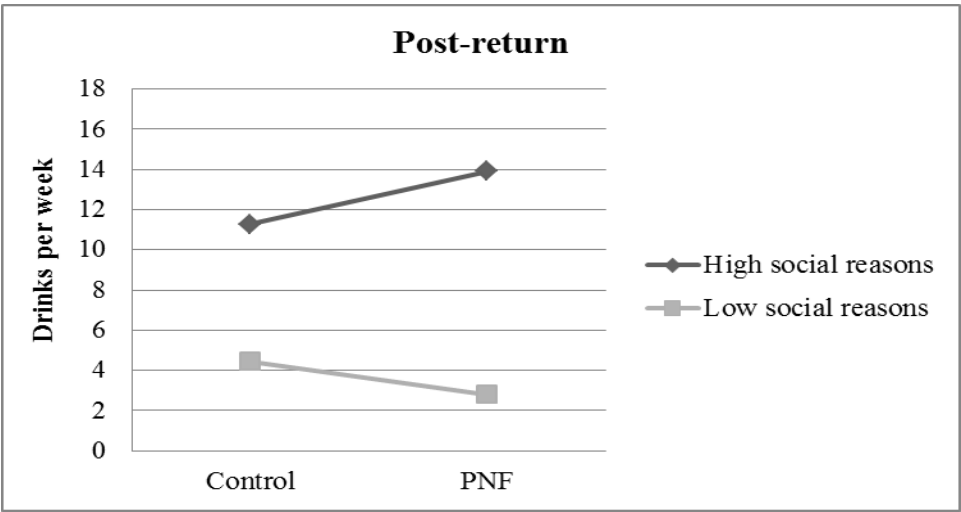
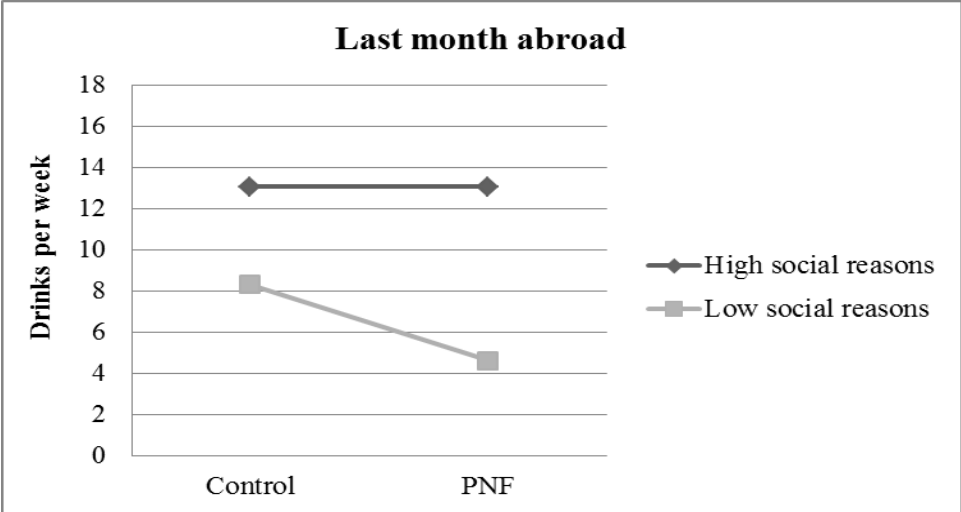
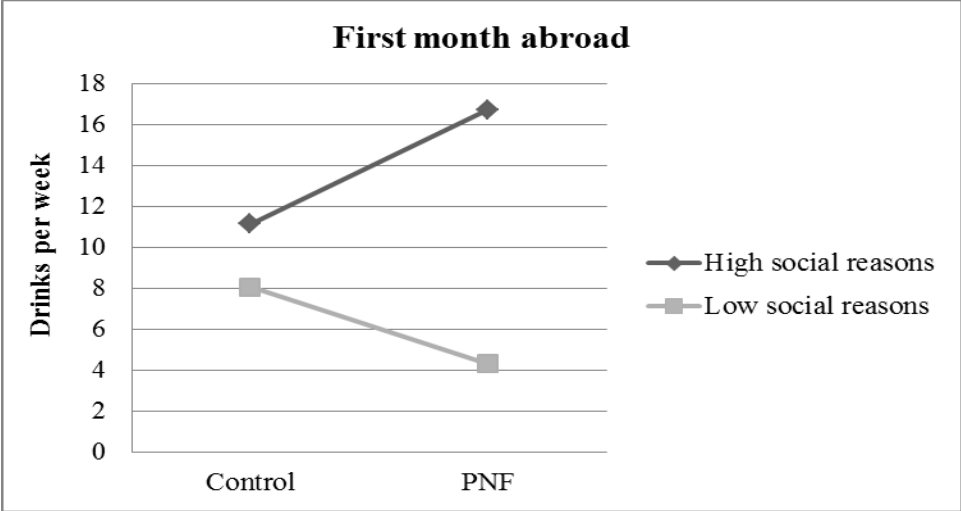


Figure 8. Social reasons for drinking moderator; PNF versus control.

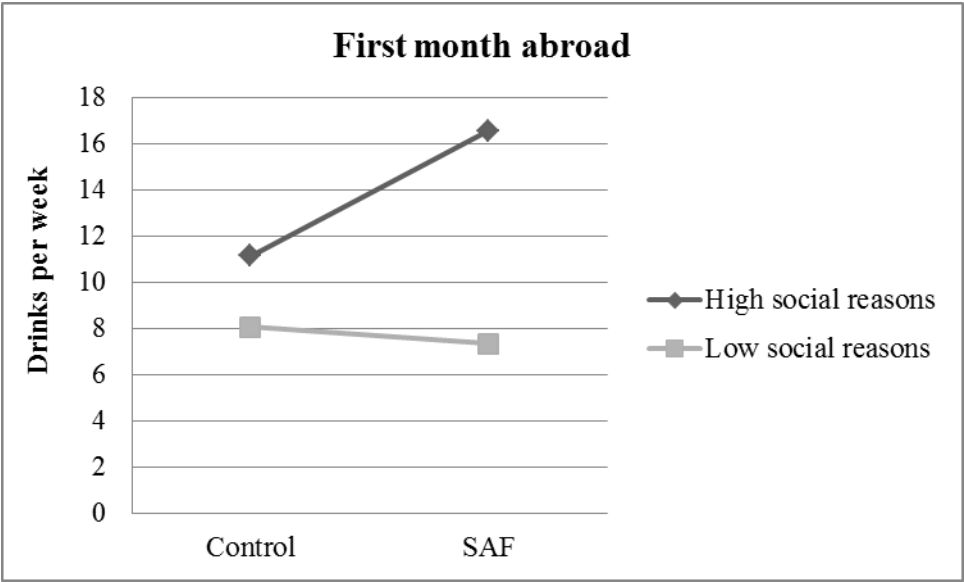


Figure 9. Social reasons for drinking moderator; SAF versus control.

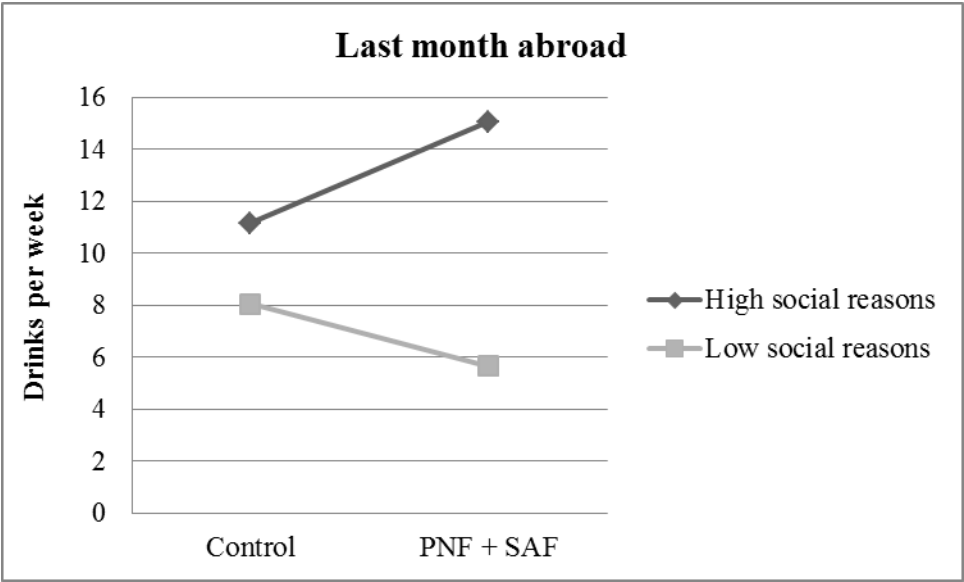


Figure 10. Social reasons for drinking moderator; PNF + SAF versus control.

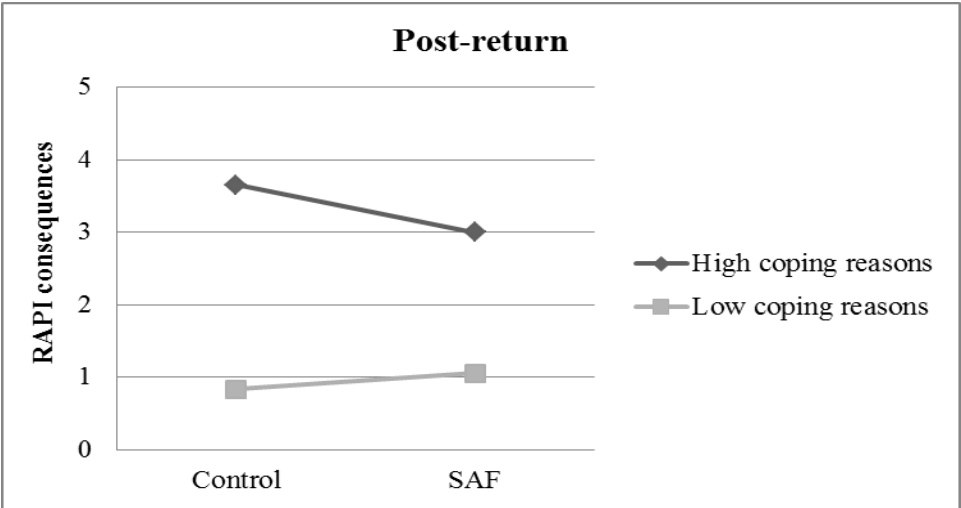
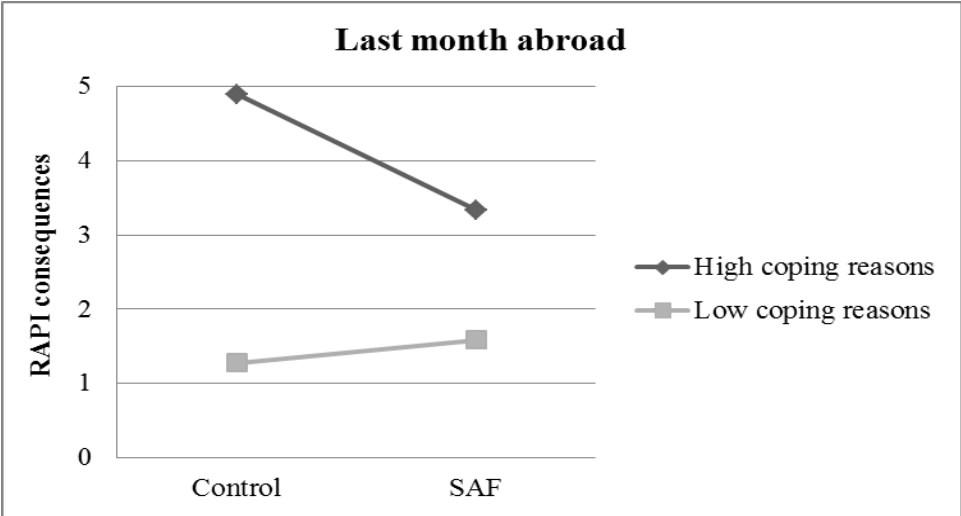
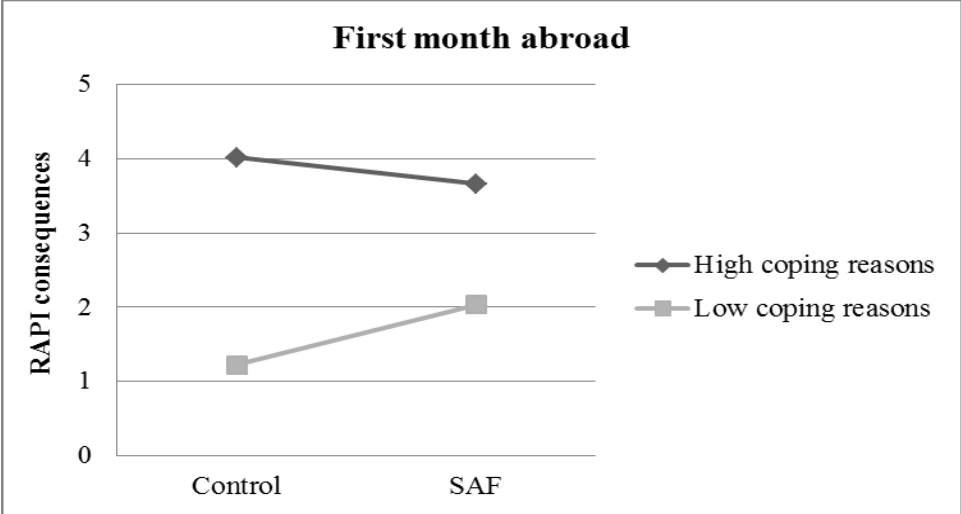


Figure 11. Coping reasons for drinking moderator; SAF versus control.

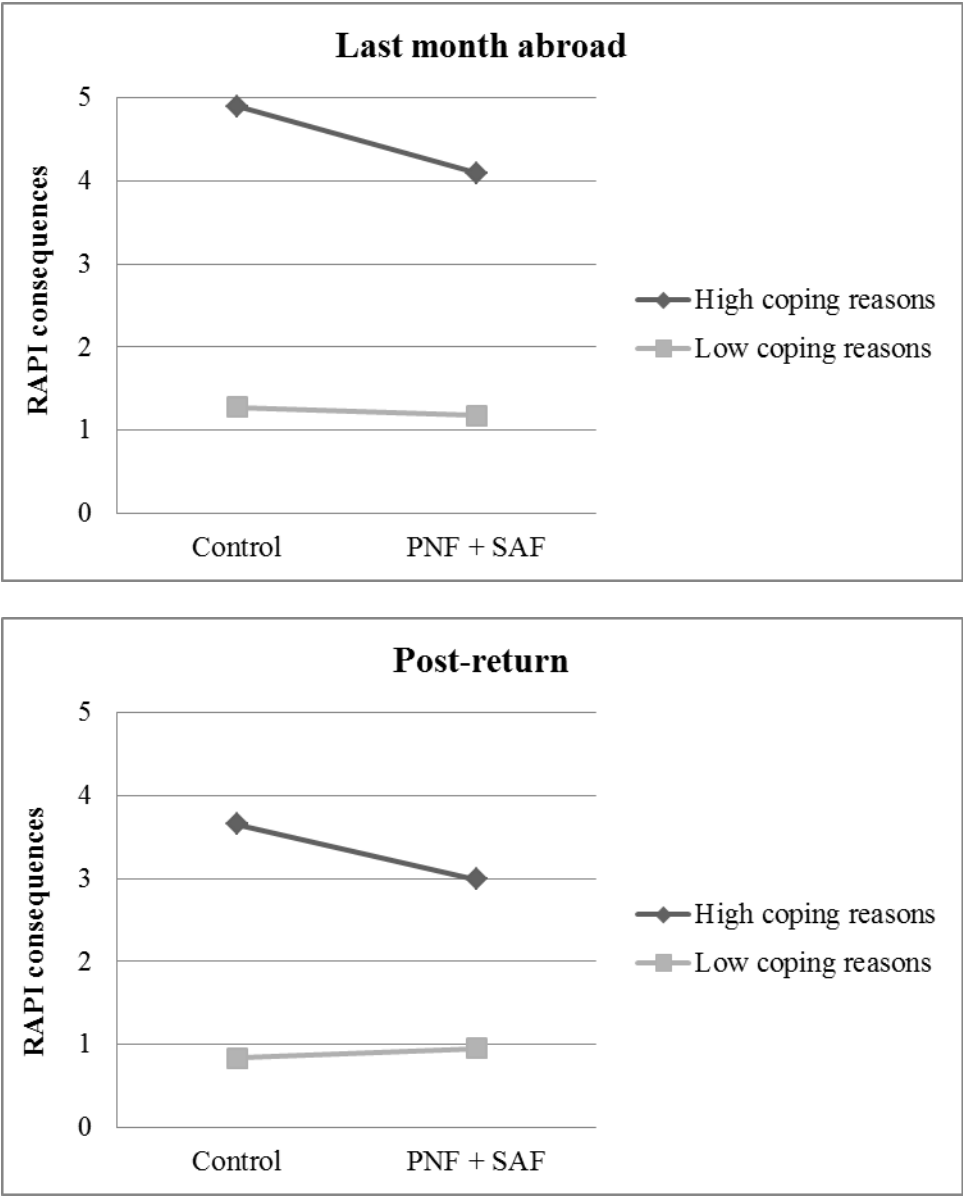


Figure 12. Coping reasons for drinking moderator; PNF + SAF versus control.

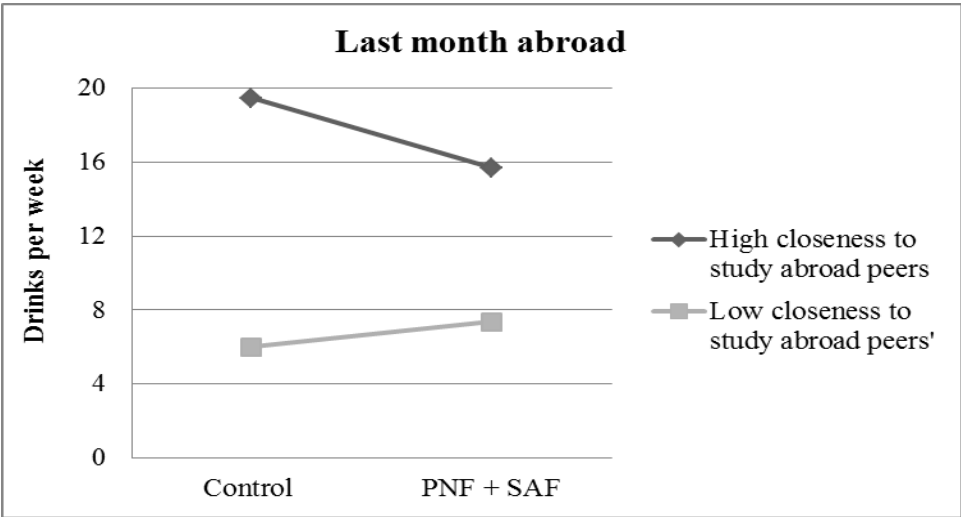
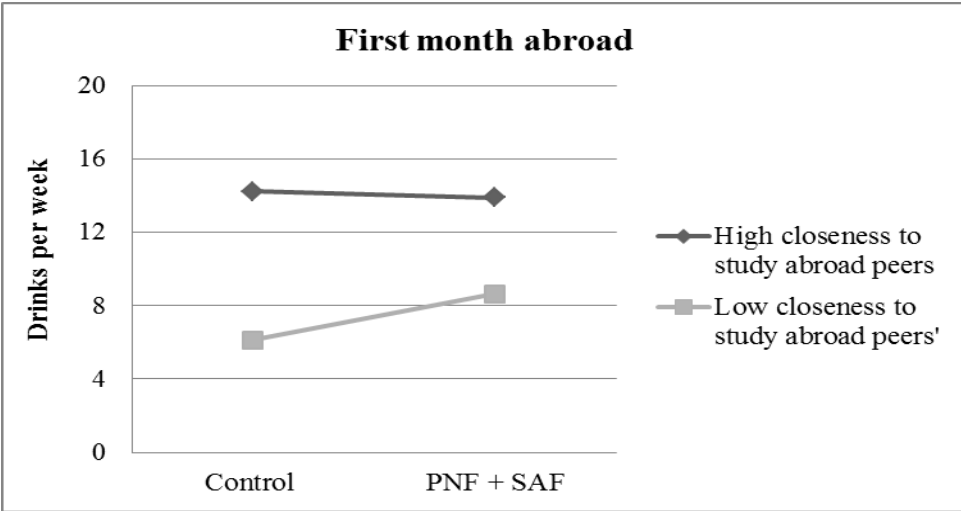
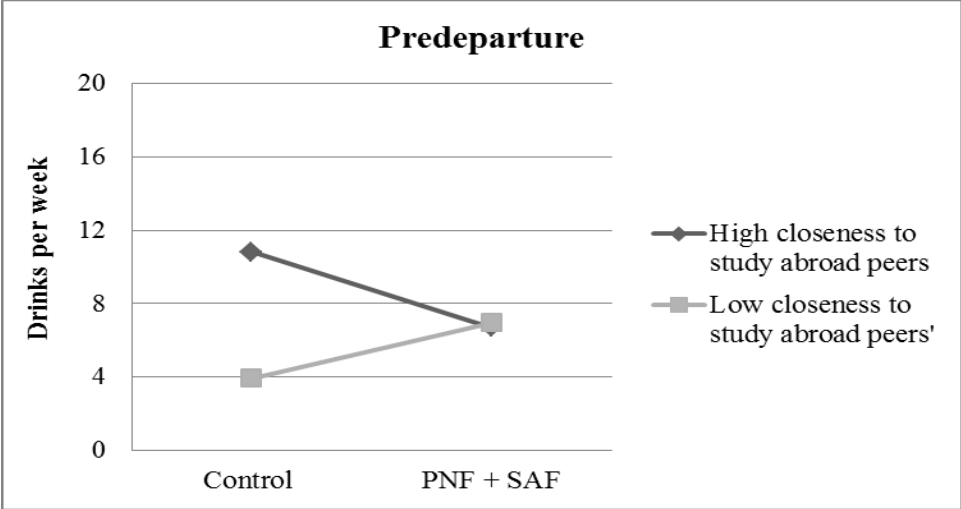


Figure 13. Closeness to region-specific study abroad peer moderator; PNF + SAF versus control.

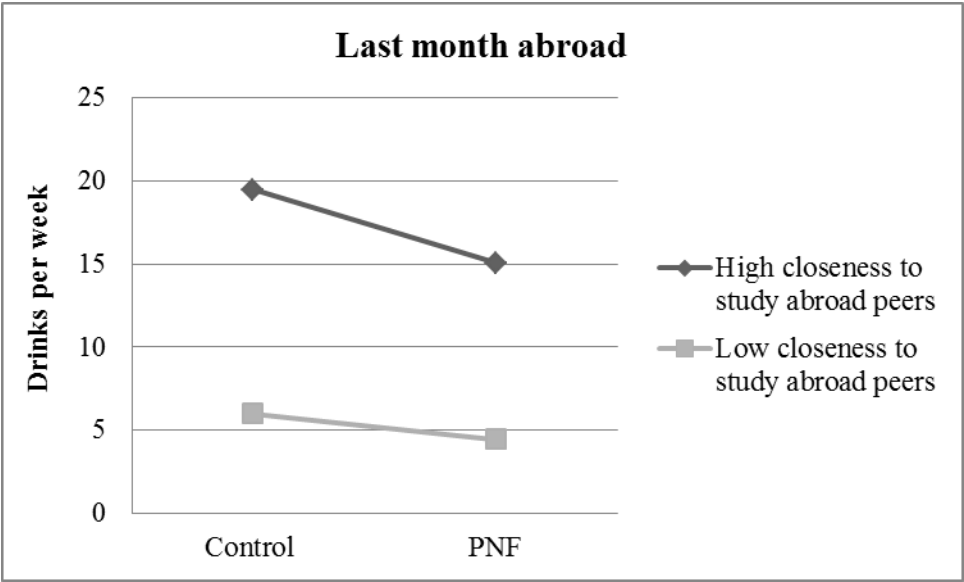


Figure 14. Closeness to region-specific study abroad peer moderator; PNF versus control.

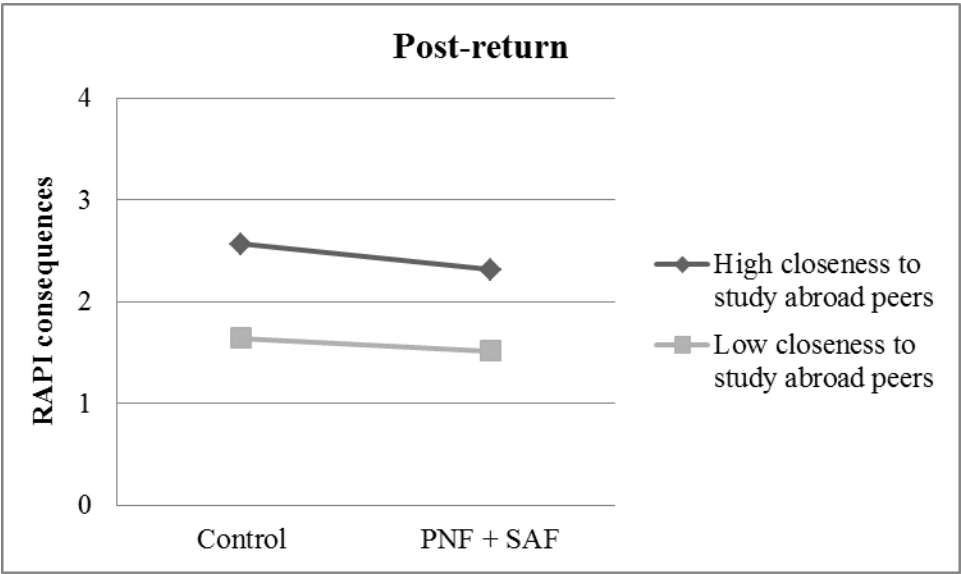
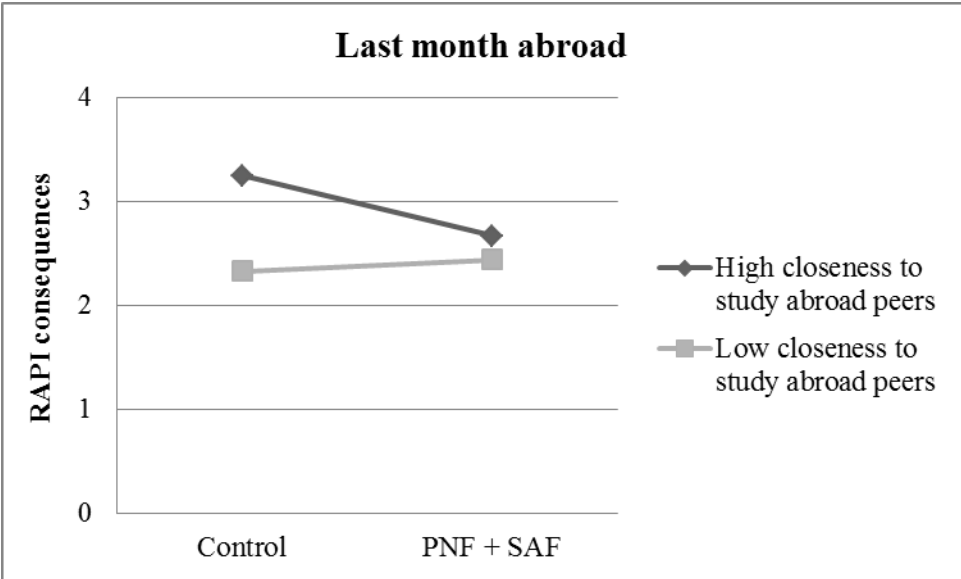


Figure 15. Closeness to region-specific study abroad peer moderator; PNF + SAF versus control.

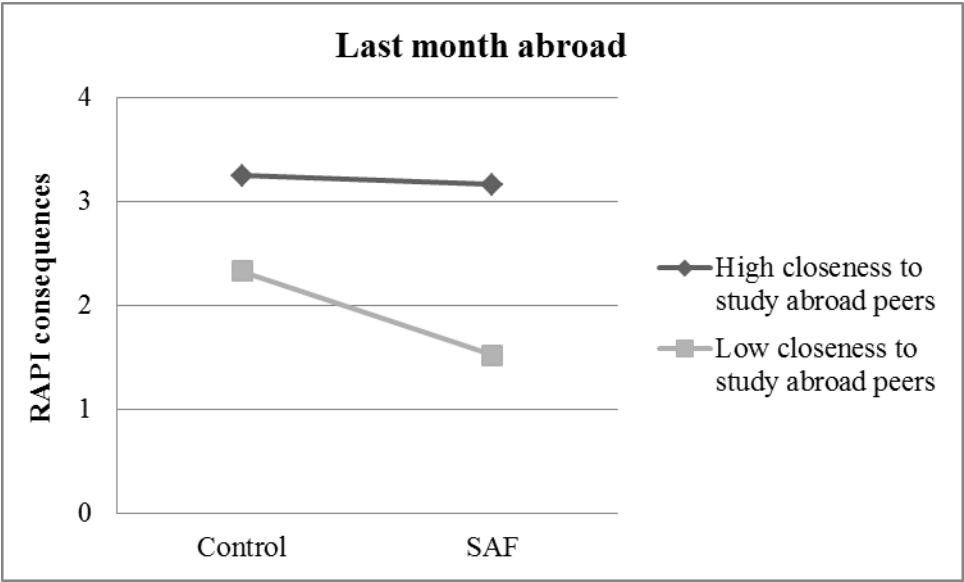


Figure 16. Closeness to region-specific study abroad peer moderator; SAF versus control.

Table 1. Multilevel regression analyses for drinks per week.

	Parameter estimate	Standard Error	Event rate ratio	95% confidence interval
<i>Predeparture</i>				
Intercept (control)	1.99	0.11	7.32	(5.90, 9.23)
PNF	-0.07	0.17	0.93	(0.67, 1.29)
SAF	-0.08	0.16	0.92	(0.67, 1.26)
PNF + SAF	-0.05	0.16	0.95	(0.69, 1.30)
<i>First month (T1)</i>				
Intercept (control)	0.28	0.09	1.32	(1.11, 1.58)
PNF	0.08	0.13	1.08	(0.83, 1.42)
SAF	0.27	0.13	1.31	(1.02, 1.68)
PNF + SAF	0.12	0.13	1.13	(0.88, 1.46)
<i>Last month (T2)</i>				
Intercept (control)	0.37	0.08	1.45	(1.22, 1.74)
PNF	-0.18	0.13	0.84	(0.64, 1.10)
SAF	0.11	0.13	1.12	(0.87, 1.43)
PNF + SAF	0.02	0.13	1.02	(0.80, 1.33)
<i>Post (T3)</i>				
Intercept (control)	0.06	0.10	1.06	(0.87, 1.28)
PNF	0.05	0.15	1.05	(0.79, 1.41)
SAF	0.17	0.14	1.19	(0.90, 1.54)
PNF + SAF	0.01	0.14	1.01	(0.76, 1.33)

Table 2. Multilevel regression longitudinal analyses for alcohol-related consequences

	Parameter estimate	Standard Error	Event rate ratio	95% confidence interval
<i>Predeparture</i>				
Intercept (control)	1.05	0.15	2.86	(2.14, 3.84)
PNF	0.10	0.21	1.11	(0.73, 1.68)
SAF	0.09	0.21	1.09	(0.73, 1.66)
PNF + SAF	0.02	0.21	1.02	(0.68, 1.56)
<i>First month (T1)</i>				
Intercept (control)	-0.06	0.12	0.94	(0.74, 1.18)
PNF	-0.04	0.17	0.96	(0.68, 1.34)
SAF	-0.02	0.17	0.98	(0.71, 1.35)
PNF + SAF	-0.08	0.17	0.92	(0.66, 1.30)
<i>Last month (T2)</i>				
Intercept (control)	0.11	0.11	1.12	(0.89, 1.40)
PNF	-0.31	0.17	0.73	(0.52, 1.02)
SAF	-0.36	0.17	0.70	(0.50, 0.96)
PNF + SAF	-0.21	0.17	0.81	(0.58, 1.13)
<i>Post (T3)</i>				
Intercept (control)	-0.24	0.13	0.79	(0.62, 1.01)
PNF	-0.12	0.18	0.89	(0.61, 1.27)
SAF	-0.20	0.18	0.82	(0.57, 1.16)
PNF + SAF	-0.17	0.18	0.84	(0.58, 1.21)

## Appendix I: Measures

### Predeparture Sojourner Adjustment Measure (SAM)

Considering *your upcoming trip abroad*, please indicate how much you agree with each of the following statements. Rate items along the following scale:

Disagree strongly	Disagree moderately	Disagree slightly	Neither disagree nor agree	Agree slightly	Agree moderately	Agree strongly
1	2	3	4	5	6	7

*During my time abroad I will...*

Item	Factor*
1 Miss my family and friends back home	6
2 Feel out of place in my host country	6
3 Feel sad or depressed about being far from home	6
4 Spend a good amount of time meeting and conversing with local people	1
5 Spend a good amount of time meeting and conversing with Americans	5
6 Enhance my understanding of my host country's culture	2
7 Actively try to learn more about local customs and traditions in my host country	2
8 Gain insight into the culture of my host country	2
9 Feel anxious or nervous about being far from home	6
10 Develop my own perspective of my host country	2
11 Socialize a good deal with local people from my host country	1
12 Socialize a good deal with other Americans	5
13 Subscribe to the values of my host country	4
14 Increase my understanding of my host country's language (or local dialect/idioms)	3
15 Behave in ways that are typical of members of my host country	4
16 Actively try to make American acquaintances	5
17 Feel like once I return home I will maintain some of the cultural-specific practices and values I learned by living in my host country	4
18 Have deep and meaningful conversations with local people	1
19 Have meaningful social interactions with local people	1
20 Have meaningful social interactions with Americans	5
21 Use my host country's language (or local dialect/idioms) to communicate with local people	3
22 Learn about the local language by communicating with local people in my host country's language (or local dialect/idioms)	3
23 Have long conversations with local people using the host country's language (or local dialect/idioms)	3
24 Subscribe to the religious and/or political beliefs of my host country	4

\**Note.* Inclusion of the “Factor” column in Appendix IA is for information purposes only. The actual measure does not contain this column, nor does it contain the description of the factors below the following version.

### Monthly Follow-up Sojourner Adjustment Measure (SAM)

Considering *your time abroad in the past month*, please indicate how much you agree with each of the following statements. Rate items along the following scale:

Disagree strongly	Disagree moderately	Disagree slightly	Neither disagree nor agree	Agree slightly	Agree moderately	Agree strongly
1	2	3	4	5	6	7

*During my time abroad in the past month I...*

Item
1 Missed my family and friends back home
2 Felt out of place in my host country
3 Felt sad or depressed about being far from home
4 Spent a good amount of time meeting and conversing with local people
5 Spent a good amount of time meeting and conversing with Americans
6 Enhanced my understanding of my host country's culture
7 Actively tried to learn more about local customs and traditions in my host country
8 Gained insight into the culture of my host country
9 Felt anxious or nervous about being far from home
10 Developed my own perspective of my host country
11 Socialized a good deal with local people from my host country
12 Socialized a good deal with other Americans
13 Subscribed to the values of my host country
14 Increased my understanding of my host country's language (or local dialect/idioms)
15 Behaved in ways that are typical of members of my host country
16 Actively tried to make American acquaintances
17 Felt like once I return home I would maintain some of the cultural-specific practices and values I learned by living in my host country
18 Had deep and meaningful conversations with local people
19 Had meaningful social interactions with local people
20 Had meaningful social interactions with Americans
21 Used my host country's language (or dialect/idioms) to communicate with local people
22 Learned about the local language by communicating with local people in my host country's language (or dialect/idioms)
23 Had long conversations with local people using the host country's language (or dialect/idioms)
24 Subscribed to the religious and/or political beliefs of my host country

\* *Factor 1* = social interaction with host nationals, *Factor 2* = cultural understanding and participation, *Factor 3* = language development and use, *Factor 4* = host culture identification, *Factor 5* = social interaction with co-nationals, *Factor 6* = homesickness/feeling out of place

### Post-return Follow-up Sojourner Adjustment Measure (SAM)

Considering *your entire time abroad*, please indicate how much you agree with each of the following statements. Rate items along the following scale:

Disagree strongly	Disagree moderately	Disagree slightly	Neither disagree nor agree	Agree slightly	Agree moderately	Agree strongly
1	2	3	4	5	6	7

*During my entire time abroad I...*

Item
1 Missed my family and friends back home
2 Felt out of place in my host country
3 Felt sad or depressed about being far from home
4 Spent a good amount of time meeting and conversing with local people
5 Spent a good amount of time meeting and conversing with Americans
6 Enhanced my understanding of my host country's culture
7 Actively tried to learn more about local customs and traditions in my host country
8 Gained insight into the culture of my host country
9 Felt anxious or nervous about being far from home
10 Developed my own perspective of my host country
11 Socialized a good deal with local people from my host country
12 Socialized a good deal with other Americans
13 Subscribed to the values of my host country
14 Increased my understanding of my host country's language (or local dialect/idioms)
15 Behaved in ways that are typical of members of my host country
16 Actively tried to make American acquaintances
17 Felt like once I return home I would maintain some of the cultural-specific practices and values I learned by living in my host country
18 Had deep and meaningful conversations with local people
19 Had meaningful social interactions with local people
20 Had meaningful social interactions with Americans
21 Used my host country's language (or dialect/idioms) to communicate with local people
22 Learned about the local language by communicating with local people in my host country's language (or dialect/idioms)
23 Had long conversations with local people using the host country's language (or dialect/idioms)
24 Subscribed to the religious and/or political beliefs of my host country

## Appendix II: Personalized Normative Feedback (PNF)

### How do you compare to other UW students studying abroad in your host region?

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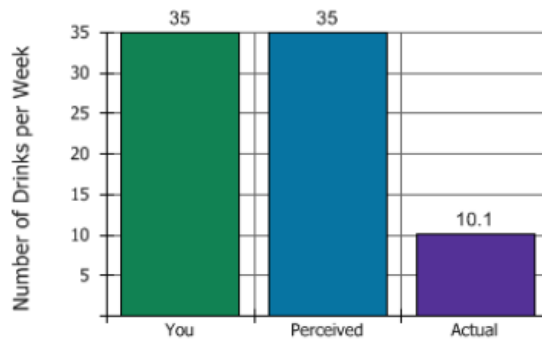
According to the information you provided us during the survey...

You intend to drink **35 drinks** per week while studying abroad.

You think the typical UW student studying in Europe drinks **35 drinks** per week while studying abroad.

Based on recent research with UW study abroad students, students studying abroad in Europe actually report drinking a mean of **10.1 drinks** per week while studying abroad.

Study Abroad Drinking

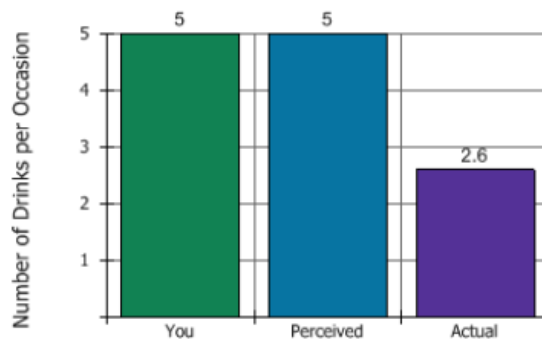


You intend to drink **5 drinks** per occasion while studying abroad.

You think the typical UW student studying in Europe drinks **5 drinks** per occasion while studying abroad.

Based on recent research with UW study abroad students, students studying abroad in Europe actually report drinking a mean of **2.6 drinks** per occasion while studying abroad.

Study Abroad Drinking



Note: Your host region, Europe, contains data from UW students who previously studied in UK, Ireland, Germany, Italy, Spain, France, Sweden, Denmark, Austria, Czech Republic, Russia, the Netherlands, Sweden, Belgium, Norway, and Greece. Information is based on a sample of over 300 UW students who studied abroad during 2008 and 2009.

**You** = What you said you intend to drink while studying abroad

**Perceived** = What you think other UW students studying abroad in your host region drink

**Actual** = What UW students studying abroad in your host region actually drink

---

## What is the drinking behavior of native people in your host country?

---

You indicated that you will be studying abroad in Ireland. Remember that "native person" refers to individuals 15 and older who were born in and live in Ireland.

### Rates of abstinence

You think the prevalence rate of abstinence among native people in Ireland is **10%**.

Based on data collected from the World Health Organization, approximately **22%** of the native population in Ireland abstained from alcohol in the past year.

### Drinks consumed per week

You believe a typical native person in Ireland drinks approximately **21 drinks** per week.

Based on data collected by the World Health Organization, the approximate number of drinks per week consumed by a typical native person in Ireland is about **17.8 drinks** per week.

The above information is based on data contained within the World Health Organization Global Status Report on Alcohol. Click on the flag to see the entire report on alcohol use for Ireland.



Note: Estimation of drinks per week was calculated by taking the reported ounces of pure alcohol consumed per person each year, which is estimated to be 462.9 ounces, and converting this number to standard drinks (remember a standard drink has ½ ounce of pure alcohol). The number of standard drinks was divided by 52 weeks in a year. To give you a reference, estimated drinks per week in the United States is 12.6.

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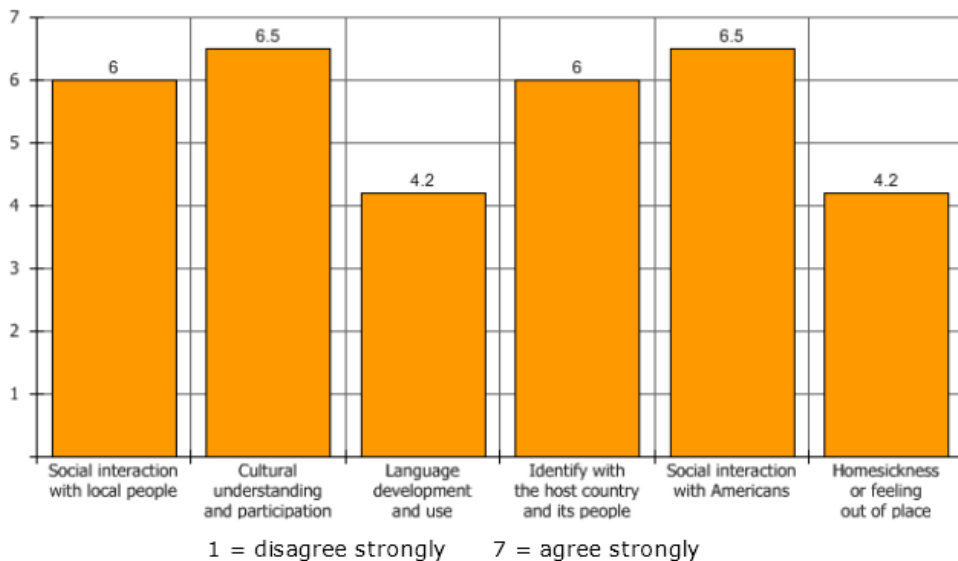
## Appendix III: Sample Sojourner Adjustment Feedback (SAF)

### Your Goals and Expectations of Cultural Engagement and Adjustment while Abroad in Italy

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The figure below represents your expected engagement in each of the following six categories related to your upcoming study abroad experience. On the following pages, you will be presented with your specific goals and expectations related to each of these categories. These will be followed by quotations from University of Washington students who have recently completed study abroad trips. Based on their own experiences living abroad, they offer suggestions and tips for meeting your goals and enjoying your time while abroad.

Mean agreement you endorsed for each goal or expectation



## Social interaction with local people in your host country

---

*You indicated that during your time abroad, you will...*

- Spend a good amount of time meeting and conversing with local people
- Socialize a good deal with people from your host country
- Have deep and meaningful conversations with local people
- Have meaningful social interactions with local people



***Here are some quotes from UW students who recently completed study abroad programs. They describe their experiences with meeting goals and setting expectations of social interaction with local people during their trips.***

"The best relationships I had with local people abroad were owners of business that I went to; local cafes and the shop I got my film developed at. Those were the people that it was the easiest and most natural to forge a relationship with because I was there on a regular basis actually doing things, so it was natural to build a relationship."

"The locals definitely want to speak to you more if you show that you are making an effort to learn the language and their customs."

"Home-stay opportunities are great. We could do home-stays as long as we wanted to. I stayed with a family for two nights, who I then met the wife's mother, who I ended up being very close to. She became my second mother and it was just from staying a couple nights with one family."

"If the town is smaller it's easier to meet people. If you have the chance to travel, go somewhere that's not a large city."

"If you have local contacts and they invite you out, go out for a while, you might eat a jellyfish without knowing it."

"I would meet someone once and they would give me their phone number and offer to show me around. It was a shock for me, because in America we don't reach out to strangers like that. It's a lot easier to meet people when they make the effort to interact with you."

"I met the most host-nationals when I was alone. When I was with other Americans there was a barrier around us. But when I would take public transport or walk alone more people would come up to me and talk to me."

"In general, be open to people, be friendly, be receptive, chat with them back and forth. It also helps to have a cell phone so they can text you easily and tell you that they are going to do something so you can come along."

***Get to know your host country's culture before leaving. Click on the links below to read about culture, etiquette, and customs in Italy.***

<http://www.kwintessential.co.uk/resources/global-etiquette/italy-country-profile.html>

<http://www.everyculture.com/Ge-It/Italy.html>

## Cultural understanding and participation

---

*You indicated that during your time abroad, you will...*

- Enhance your understanding of your host country's culture
- Actively try to learn more about local customs and traditions in your host country
- Gain insight into the culture of your host country
- Develop your own perspective of your host country

***Here are some suggestions from UW study abroad students for how to gain a deeper understanding of the host culture while abroad.***

"Be educated before you go on your trip. Read some books about the country so you have a broad understanding of the culture and then when you arrive, be very observant; do as the locals do."

"Living with a host family is a huge part of it, because you are surrounded by the culture and they can answer your questions about the culture."

"Learning the language is the best way to understand the culture."

"If you show that you are interested in the culture the local people really like you."

"Pick the far flung spots on a subway map because you know of one thing and you are bound to see something else along the way."

"Roaming, exploring, going on long walks; just walking around, just simple stuff, is really important because you never know what you are going to run into, who you are going to meet or what you are going to see, or what events you will run into."

"I went to the embassy website and they were very happy to send me a big package of guides, maps, and tour books just for asking. But don't spend all of your time doing the tourist thing."

"It's helpful to take a history class. When I was abroad I took three classes and one was the history and culture of my host country, and it was great because you learn about it and then you go outside and there it is. It gives you an appreciation for what you are experiencing and why you should be partaking in it."

"If you want to immerse yourself in the culture you need to take the extra step to explore what's around you, get away from your usual scene and try something different."

"Drop the guide book and jump right in with both feet. Read the local paper, look for things to do, and go experience them and you'll meet a lot of interesting local people."

***Check out the local news in Italy by clicking the links below. You can also find local and region-specific cultural activities to engage in from these sites.***

<http://www.lifeinitaly.com/>

<http://www.inromenow.com/site%20templates/index.htm>

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## Language development and use

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*You indicated that during your time abroad, you will...*

- Increase your understanding of your host country's language (or dialect/idioms)
- Use your host country's language (or dialect/idioms) to communicate with local people
- Have long conversations with local people using the host country's language (or dialect/idioms)

***Here are some quotes from UW study abroad students about their experiences developing and using the local language in their host countries.***

"I took two years of language classes before I went, but the most useful stuff was day-to-day 'living in the culture' that I never learned in school. Things like, going to the store and asking for things, going to the post office, where no one spoke English. Just dealing with tasks that force you to put yourself out there helped a lot. It not only helps with your vocabulary but it makes you a habitual speaker of the language, which is different from what you learn in class."

"My host family and other kids would teach me how to speak the language. I would say 'this is this in English, what is it in your language?' And they would teach me."

"The key is being persistent; use whatever you know. It's easy to default into English because they know you are an English speaker and they may want to practice their English with you, but if you keep trying to use their language they will help you out with it too. I liked reading bilingual signs; there you can read a word in English and see it in a different language. I learned a few things that way. Also, pay attention to local media or people talking; see what you can pick up and figure out."

"My host-family watched this TV show. At first I couldn't understand what was going on, but after a while it seemed less complex. It was pretty dramatic how much you can learn from watching a simple TV show."

"One night, it was just me, another American who was fluent in the local language and a local girl who spoke no English, and all we did was go back and forth. She would ask me a question in English and I would try to respond in her language, but most of the time I didn't know, so I would try and draw my answer by asking my friend in the local language, 'how do you say this?' That was one of my favorite memories."

"The people I hung out with had a lot of fun when I tried to speak their language. They really appreciated you trying to learn their language instead of only speaking English."

"If you ever have an opportunity to work with children that speak the language it's really helpful because they are not to the level of an adult but still better than you are."

"It's always good practice to speak at a restaurant or local shops; it's an easy way to use simple phrases. I tried to fit in any practice where I could."

"It's funny when you can tell that someone is talking about you and not only can you understand them but you can respond."

***Here are links to online dictionaries and resources for helping you develop your language skills before and during your trip.***

<http://www.kwintessential.co.uk/resources/language/italian-phrases.html>

[http://www.smartphrase.com/Italian/it\\_general\\_words\\_phr.shtml](http://www.smartphrase.com/Italian/it_general_words_phr.shtml)

## Identification with the host country and its people

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*You indicated that during your time abroad, you will...*

- Subscribe to the values of your host country
- Behave in ways that are typical of members of your host country
- Feel like once you return home you would maintain some of the cultural-specific practices and values you learned by living in your host country
- Subscribe to the religious and/or political beliefs of your host country

***Here are some suggestions from UW study abroad students based on their experiences developing identification with the local culture and gaining a greater understanding of the beliefs, practices, and traditions of local people.***

"Put yourself in situations where you feel embarrassed at first. Dancing was a really big part of their culture, and I don't normally dance here, but there was no other option for me because everyone kept forcing me to do it. And I didn't want to offend them so I ended up doing it. That was a big thing for me, because I normally don't dance, but then I had enough courage and got over my embarrassment."

"Something that was really important for me was spending time with my family during the home-stay. I would help cook, watch TV with them and help some of the kids with their homework. That was the fastest way for me to learn about the culture; by doing the everyday things that everyone else does."

"Travelling alone was a distinctly different experience than travelling in the group, because when you travel with your study abroad group you are stuck with them and you can't go out by yourself. So, it's a good balance to go on an unstructured trip with your friends."

"With politics people definitely have their opinions so if you ask them about it they will go on talking for a long time."

"When it came to food I wasn't supposed to eat for religious reasons, I came up with a don't-ask-don't-tell policy. You do a lot of bowing to shrines in Buddhism and in my religion you are not supposed to bow. So that was awkward, but I would do it as best as I could to be respectful to them, but I didn't know what I was doing so it was ok."

"Since I've been home I still watch the local news from my host country everyday on the Internet. I also keep in contact with the local friends I made through Facebook."

"Since I've been home I tried to maintain my language skills by speaking the language in the appropriate restaurants around campus."

"In any country you have to be willing to try new things, and not just in the sense of food. Some cultures are much 'more touchy' in terms of personal space and guys will walk down the street with their arms around each other. It's normal. So understanding why they do that, and being open to it. Just generally being open to new experiences will help."

"You have to be ok with discomfort, not with dangerous situations, but cultural things you aren't used to."

"It's good to go places alone because you can wander around to talk to different people and see things you wouldn't notice if you were walking down the street with friends."

"Be spontaneous. Throw yourself into situations just because you can. Travel; take advantage of anything that is put in front of you because it's fun."

***Click on the links below to read more about culture, etiquette, and customs in Italy. Learn about personal space, communication styles, gestures, and taboos to help you gain a better sense of what it means to be a member of your local country.***

<http://wikitravel.org/en/Italy>

[http://www.culturecrossing.net/basics\\_business\\_student.php?id=102](http://www.culturecrossing.net/basics_business_student.php?id=102)

## Social interaction with other Americans

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*You indicated that during your time abroad, you will...*

- Spend a good amount of time meeting and conversing with Americans
- Socialize a good deal with other Americans
- Actively try to make American acquaintances
- Have meaningful social interactions with Americans

***Here are some quotes from UW students describing their experiences interacting with other Americans during their trips.***

"If you are with a group of Americans and you're speaking English, people may avoid you."

"It's important to go out in smaller groups. In my program there were 30 students and when we all went out together we were really intimidating and probably obnoxious. But, just grab a couple friends as opposed to a big group and you are a lot more likely to meet people."

"We always joked that if there were too many Americans at one place at the same time that we would spontaneously combust."

"It is important to remember that you are abroad and that it is not permanent so do go out of your way to meet local people, but it's not the end of the world if you establish close relationships with the Americans there."

"Me and eight other girls were sharing an apartment and right above us were a bunch of other people from the program and they stayed in most of the time and partied by themselves. I felt that they didn't really get to know the city very well because most of the time they stayed in and had fun by themselves."

"There was 19 of us Americans living in a house together, so it was hard to distance yourself from the other people in the house. So if you did go out with a conscious effort to do your own thing it was like you were making a statement. I think that if I had lived by myself my view of hanging out with other Americans would probably be different."

"You need to take advantage of the place where you are. You can't be too consumed with what you are doing, with your American friends, and your school because then you won't get a full experience."

***Click on the link below for a funny article about one student's experience spending his time with other Americans abroad.***

<http://www.theonion.com/content/node/38803>

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## Homesickness and feeling out of place within your host country

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You indicated that during your time abroad, you may...

- Miss your family and friends back home
- Feel out of place in your host country
- Feel sad or depressed about being far from home

**Here are some tips and suggestions from UW study abroad students based on their experiences adjusting to life abroad.**

"I wrote a lot of postcards. I sent a postcard to my best friend every single week. It's helpful because it's a way to be in contact with people you are missing while also sharing the good of your experiences."

"If you are religious, go to a religious service in the country because people are usually pretty welcoming there. So if you are feeling homesick do something you would do at home, like play soccer."

"I would shoot notes back and forth on Facebook or email and I would use a phone card to call home every once and a while."

"I brought some stuff with me, like Girl Scout cookies; things I knew I would never find over there and every once in a while I would break them out. Also, I think Skype is amazing. It's a great way to stay connected with people from back home."

"Do what you can when you feel homesick but sometimes you are going to have to ride it out because it won't last forever. When I first got there I was pretty homesick but then it went away when I got settled in but about half way through I hit a really rough patch and it lasted about a week. But then it was fine again, so I think you have to ride it out."

"Downloading American shows I liked from iTunes was really great because it brought me back to a really good place, especially if I had an American there with me. It's like, if you really need to, indulge. If you want an American moment, just do it - it feels great."

"Living with a host family was a really big deal. I felt like I had a mom and dad and two little brothers that I took care of and we had a guy living with us that we called "our cousin" because it felt like we had a family there."

"I accepted early on that I was never going to fit in, so I lived with it. You are never going to fully fit in and you just need to accept that and make the best out of it because it can be fun to be the outsider. Some people try and get local clothes but they still stick out, so I just went with it and it was fine."

"Try to embrace the culture; that is the only way to enjoy your time there and not be homesick. Go out and sight-see, learn about where you are and appreciate what is around you."

"Bring pictures of your family, your house, places you like back home, and your friends."

**Click the links below to learn a bit about what you may experience while abroad and how to handle stress and anxiety about being far from home. Simply being aware of what to expect may help with adjustment difficulties.**

<http://www.diversityabroad.com/cultural-shock>

[http://www.worldwide.edu/travel\\_planner/culture\\_shock.html](http://www.worldwide.edu/travel_planner/culture_shock.html)

<http://www.juliaferguson.com/shock.html>

