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Culture, peer influence, cognition, and alcohol use among college students in China:

Implications for future research and interventions

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Culture, peer influence, cognition, and alcohol use among college students in China: Implications for future research and interventions

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Li Sun

Master of Public Health

Advisor: Michael Windle, PhD

An abstract of

A dissertation submitted to the Faculty of

the James T. Laney School of Graduate Studies of Emory University

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in Behavioral Sciences and Health Education

2014

Abstract

Culture, peer influence, cognition, and alcohol use among college students in China:

Implications for future research and interventions

By Li Sun

Alcohol use among college students has become a significant health concern in many parts of the world. Unfortunately, little is known about this phenomenon in most developing countries. To address the emerging issue of college drinking in China, guided by the social ecological model and related theories, we conducted three studies to investigate the effects of culture, peer influence, and cognition on alcohol use among Chinese college students. Participants were 436 undergraduate students recruited from one college in China. A self-administered survey questionnaire was used to assess alcohol-related outcomes (alcohol use, heavy drinking, and alcohol-related problems) and associated psychosocial correlates. Study 1 focused on the interaction between culture and peer influence. Findings showed that Western cultural orientation moderated the effects of perceived best friend use and perceived average student use on alcohol use, and the directions of these two moderated effects were opposite. Perceived best friend use was revealed to partially mediate the effect of Western cultural orientation on alcohol use. Chinese cultural orientation, however, was not directly or indirectly associated with any alcohol-related outcomes. Study 2 investigated peer influence (i.e., perceived peer norms) on alcohol use. The results showed that participants did not perceive that peer referents consumed more alcohol, but perceived that more peers drank heavily than themselves. Perceived peer norms were positively related to alcohol-related outcomes, and self-other-discrepancy for alcohol use was negatively related to alcohol use. Both alcohol expectancies and drinking refusal self-efficacy were shown to partially mediate the effects of perceived peer norms on alcohol-related outcomes. Study 3 focused on three alcohol-related cognitive factors. Alcohol expectancies and drinking refusal self-efficacy were shown to be significantly related to alcohol-related outcomes, and drinking motives partially mediated these associations. Drinking refusal self-efficacy was not found to be a significant moderator of alcohol expectancies, however. Findings of these studies are largely consistent with previous research, providing support for the utility of related theories for studying college drinking in China. To address empirical questions suggested by these studies and inform interventions for Chinese college students, theory development and more research are needed.

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Acknowledgements

At this exciting moment of graduation, I want to say special thanks to my advisor, Dr. Michael Windle for his mentoring and support during the whole process of my study in the PhD program. I also want to thank Drs. Nancy Thompson and Gene Brody for their great support during my dissertation research and writing. Finally, I want to thank my DGS Drs. Kimberly R Jacob Arriola and Michelle Kegler, faculties and staff of BSHE department, my fellow students, and my dear family members. Thank you all. I’m grateful for all your help and support.

Table of Contents

INTRODUCTION

Alcohol is causally related to many infectious and non-communicable diseases and injuries (Parry, Patra, & Rehm, 2011; Rehm et al., 2010; Rehm et al., 2009). Compared with people of other age groups, adolescents and young adults have been disproportionately affected more by alcohol in deaths, diseases, and injuries (Rehm, et al., 2009; World Health Organization, 2007). For example, the WHO Global Burden of Disease Study has shown that, in 2004, alcohol-attributable deaths in males were highest among the group of 15-29 year-old (World Health Organization, 2011a), and alcohol was the leading risk factor for incident disability-adjusted life year for people aged 10 to 24 (Gore et al., 2011).

Due to the combined effects of individual risk factors such as personality and alcohol expectancies (Baer, 2002) and environmental risk factors such as the availability of alcohol on campus (National Institute on Alcohol Abuse and Alcoholism, 2002; Presley, Meilman, & Leichliter, 2002), alcohol use among college students has become a significant health concern in many parts of the world (Karam, Kypri, & Salamoun, 2007). Compared with their non-college peers, college students tended to drink more frequently and heavily (Carter, Brandon, & Goldman, 2010; Dawson, Grant, Stinson, & Chou, 2004; O'Malley & Johnston, 2002). Collegiate drinking has been associated with a range of negative consequences such as injuries, drinking-and-driving, risky sexual behaviors, and alcohol abuse and dependence (Griffin, Umstattd, & Usdan, 2010; Hingson, Zha, & Weitzman, 2009; Kaly, Heesacker, & Frost, 2002; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). Heavy drinking by some college students has also been associated with many secondary effects in other students such as being assaulted and having one's property damaged (Wechsler, et al., 1994; Wechsler,

Moeykens, Davenport, Castillo, & Hansen, 1995). Moreover, for some individuals, alcohol use during the college years has been related to alcohol use disorders in the long term (Jennison, 2004; O'Neill, Parra, & Sher, 2001).

The high prevalence of drinking and heavy drinking among college populations has been observed in many developed countries such as Australia (Pennay, Lubman, & MacLean, 2011), New Zealand (Kypri, Cronin, & Wright, 2005; Kypri, Langley, McGee, Saunders, & Williams, 2002), European countries (Wicki, Kuntsche, & Gmel, 2010), Canada (Kuo et al., 2002), and the U.S. (O'Malley & Johnston, 2002; Wechsler et al., 2002). Though data have been limited in developing countries, evidence has suggested that the pattern of heavy drinking among adolescents and young adults is spreading from the developed world to the developing world (Jernigan, 2001; Room et al., 2002). For example, a review on related publications during 2005 and 2006 has reported that the prevalence of heavy drinking among college populations in South America was as high as that in the U.S. (Karam, et al., 2007).

Alcohol use in adult Chinese has been relatively low in the WHO Western Pacific region (World Health Organization, 2011b). Nonetheless, along with its economic development in recent years, China has become one of the largest beer producers in the world (Xinhua News Agency, 2009), and alcohol use in Chinese has increased sharply. The total recorded per capita alcohol consumption of pure alcohol by adult Chinese in 2005 has increased nearly six-fold since 1970 (1.03 liters in 1970 and 5.9 liters in 2005) (World Health Organization, 1999, 2011b). China currently has about 23 million undergraduate students (Ministry of Education of the People's Republic of China, 2013), and recent national epidemiological research has shown that college drinking has become a significant issue in

this country (Ji, Hu, & Song, 2012). In 2009, 49.3% of Chinese college students surveyed reported having had at least one drink in the past 30 days, and 23.5% of students surveyed reported having had five or more drinks on a single occasion in the past 30 days (Ji, et al., 2012). To address this emerging issue of college student drinking in China, we conducted three studies to investigate major psychosocial correlates of alcohol use among Chinese college students. Since most prior research on college drinking has been conducted in North America, these studies may not only contribute to theory testing and development, but also help to inform interventions for the large Chinese college population.

Most developing countries do not have a tradition of alcohol policy (Anderson, Chisholm, & Fuhr, 2009). Similarly, China currently only has some alcohol-related laws and regulations in place, such as taxation and prohibition of drinking-and-driving (Tang, Xiang, et al., 2013). Restrictions on legal drinking age, sale time and places of alcohol, and alcohol marketing have been very loose or nonexistent in China (Tang, Xiang, et al., 2013). As a result, alcohol use among adult Chinese appears to be mainly controlled by culture, tradition, social pressure, and the economy (Hao, Chen, & Su, 2005). Although excessive drinking is banned in educational institutions in China, the enforcement of alcohol control policies is generally weak in colleges and universities. Alcoholic beverages are readily available in restaurants on campus in the participating college of Chengdu Medical College. This college is a small-size college with about 8000 enrolled students located in Chengdu, the economic and cultural center in western China.

LITERATURE REVIEW

Theories:

The phenomenon of college drinking occurs within its specific environment. The significance of the environment for college drinking has been consistently supported by empirical evidence, such as the College Alcohol Study (Wechsler, Kuo, Lee, & Dowdall, 2000; Wechsler & Nelson, 2008; Weitzman, Nelson, & Wechsler, 2003), NIAAA Task Force on College Drinking (National Institute on Alcohol Abuse and Alcoholism, 2002), and related reviews (Dowdall & Wechsler, 2002; Presley, et al., 2002). Thus, to gain a comprehensive understanding of college drinking in China, it is necessary to study both individual and environmental factors affecting alcohol use by Chinese college students. To this end, the social ecological model (Bronfenbrenner, 1979; Sallis, Owen, & Fisher, 2008), a theory that emphasizes the macro, immediate, and micro environments of behaviors, provides us with an ideal theoretical framework to investigate correlates of alcohol use at the cultural, interpersonal, and intrapersonal levels of the environment through three studies. Also, related theories were applied in each of the three studies to investigate the associations among specific variables. Consistent with the focus of the social ecological model (Bronfenbrenner, 1979), interactive associations among study variables at different levels of the environment were investigated in Study 1 and Study 2.

Study 1 examined the possible influence of culture on Chinese college students' drinking-related behaviors. Although a substantial amount of research has demonstrated that heritage and Western culture affected alcohol and other substance use among minority adolescents and young adults in Western societies (Hendershot, MacPherson, Myers, Carr, & Wall, 2005; Le, Goebert, & Wallen, 2009; Unger et al., 2002), related research with

non-Western younger populations has been very limited. Based on the proposition that cultural variables serve as contextual effect modifiers of other lower level factors (Castro & Alarcón, 2002; Castro, Shaibi, & Boehm-Smith, 2009), Study 1 addressed the gap that no prior research had studied the potential moderating role of culture in the relationship between peer influence and alcohol use among college students in non-Western societies. Additionally, based on theories of adolescent substance use (Oetting, Donnermeryer, Trimble, & Beauvais, 1998), peer influence was tested as a potential mediator of cultural variables. Given the evidence that acculturation theory may be applicable to non-Western populations (Chen, Benet-Martinez, & Harris Bond, 2008; Diaz & Zirkel, 2012), this exploratory study may contribute to theory testing and development in acculturation research by examining the influence of culture on alcohol use among college students in an Asian society.

Guided by social learning theory (Bandura, 1977; Maisto, Carey, & Bradizza, 1999), Study 2 focused on peer influence, a potent interpersonal factor affecting alcohol use among college students (Baer, 2002; Borsari & Carey, 2001; Ham & Hope, 2003). Social learning theory (Bandura, 1977; Maisto, et al., 1999) emphasizes the relationship between behaviors and their immediate social environment, and therefore provides us with a good framework to study the effect of peer influence on alcohol use by Chinese college students. Based on empirical research of college students in North America (Borsari & Carey, 2001), peer influence was operationalized as perceived peer norms. This study addressed the gap that perceived peer norms among Chinese college students had not been investigated in prior research. Moreover, because social learning theory (Bandura, 1977; Maisto, et al., 1999) emphasizes cognitive processes (i.e., outcome expectancies and self-efficacy) in the

relationship between behaviors and the environment, it allowed us to address the gap that no prior research had tested the potential mediating role of drinking refusal self-efficacy in the association between peer influence and alcohol use.

Finally, alcohol expectancy theory (Goldman, 1994; Goldman, Brown, Christiansen, & Smith, 1991; Goldman, Del Boca, & Darkes, 1999), social learning theory (Bandura, 1977; Maisto, et al., 1999), and the motivational model of alcohol use (Cox & Klinger, 1988, 2004) guided us to investigate the effects of three cognitive factors (i.e., alcohol expectancies, drinking refusal self-efficacy, and drinking motives) on alcohol use among Chinese college students in Study 3. Although family history of alcoholism and personality are also established intrapersonal antecedents of alcohol use (Goldman, 2002), these factors are extremely difficult to be intervened upon. Therefore, Study 3 focused on the three cognitive factors that have been consistently shown to be related to alcohol use among college students (Baer, 2002; Evans & Dunn, 1995; Ham & Hope, 2003; Oei & Jardim, 2007; Young, Connor, Ricciardelli, & Saunders, 2006), and have been demonstrated to be modifiable via interventions (Burleson & Kaminer, 2005; Jones, 2004; Komro et al., 2001). Theories on alcohol-related cognition such as alcohol expectancy theory (Goldman, 1994; Goldman, et al., 1991; Goldman, et al., 1999) were applied to contribute to the literature in which no prior research has investigated the direct and indirect (i.e., moderation and mediation) associations among alcohol-related cognitions and alcohol use by Chinese college students. The following section is a review of the five psychosocial correlates of alcohol use investigated in the three studies, including culture, perceived peer norms, alcohol expectancies, drinking refusal self-efficacy, and drinking motives.

Culture:

Culture can be defined as a set of knowledge, values, and practices for dealing with the physical and social environments that is passed on from one generation to another (Oetting, et al., 1998). The influence of culture on alcohol use was first studied in ethnographic research. For example, the meaning of drinking (Mandelbaum, 1965) and pathological drinking (O'Nell & Mitchell, 1996) were found to be culturally defined within minority groups (e.g., Hispanic, African-American, and Native American) in Western societies. Subsequently, Western health researchers have recognized that culture is an important issue in alcohol and other substance use among minority adolescents and young adults (Prado, Szapocznik, Maldonado-Molina, Schwartz, & Pantin, 2008; Szapocznik, Prado, Burlew, Williams, & Santisteban, 2007). Nevertheless, most related research in the health field has focused on the influences of culture on mental and physical health outcomes (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005; Organista, Organista, & Kurasaki, 2003; Schwartz, Unger, Zamboanga, & Szapocznik, 2010); research on cultural influence on alcohol use among minorities, especially young adults (Brook & Pahl, 2005; Zamboanga, Raffaelli, & Horton, 2006), has been quite limited.

The underlying theoretical frameworks for research on cultural influence on alcohol and other substance use among minorities in Western societies include the cultural values and stress/coping paradigms (Unger et al., 2004). The cultural values paradigm assumes that certain cultural values may protect against or promote alcohol use. For example, national level variations in individualism-collectivism have been shown to be associated with more

alcohol and other drug use, independent of the effect of gross domestic product (T. P. Johnson, 2007). The stress/coping paradigm assumes that minorities in Western countries may experience stress during the process of acculturation and may resort to alcohol as a coping strategy. For example, acculturative stress has been reported to mediate the effect of ethnic identity on substance use by American Hispanic adolescents (Zamboanga, Schwartz, Jarvis, & Van Tyne, 2009). It should be noted that minority adolescents and young adults may not necessarily drink alcohol to cope with acculturative stress, and they may actively follow peer norms and engage in drinking together with their peers (Oetting, et al., 1998).

The cultural values and stress/coping paradigms (Unger, et al., 2004) suggest that heritage culture may protect against, while Western culture may promote alcohol use among minorities. Research findings about the influence of culture on alcohol use among minority adolescents and young adults in Western countries have been inconsistent to date. Regarding the influence of heritage culture on alcohol and other substance use, some research has shown that heritage culture-related variables (e.g., values and identification) were negatively associated with alcohol (Gazis, Connor, & Ho, 2010; Unger, et al., 2002) and substance use (Le, et al., 2009) among minority adolescents, as well as alcohol use among minority adults (Cuadrado & Lieberman, 1998). Other research has reported that these variables were not significantly related to alcohol use by minority adolescents (Unger, et al., 2002) and college students (Iwamoto, Liu, & McCoy, 2011).

Regarding the influence of Western culture on alcohol and other substance use, most research has shown that Western culture-related variables (e.g., acculturation and values) were associated with more alcohol and other substance use among American minority adolescents

(Hahm, Lahiff, & Guterman, 2003, 2004; Le, et al., 2009; Schwartz et al., 2013), college students (Hendershot, et al., 2005), and community adults (Alaniz, Treno, & Saltz, 1999; Caetano, 1987; Herman-Stahl, Spencer, & Duncan, 2003; Zemore, 2007). Additionally, there have also been some research showing that these variables were related to less alcohol use among American minority adolescents and college students (Fosados et al., 2007; Hendershot, Dillworth, Neighbors, & George, 2008; Schwartz, et al., 2013).

In view of the modest (Brook & Pahl, 2005; Brook, Whiteman, Balka, Win, & Gursen, 1998) and sometimes non-significant (Iwamoto, et al., 2011; Thai, Connell, & Tebes, 2010) direct associations between cultural variables and alcohol use, as well as the mixed findings of the effect of culture on alcohol and other substance use among minorities, researchers have suggested that the moderating mechanism should be one focus in research (Castro & Alarcón, 2002; Marin, Organista, & Chun, 2003; Unger, 2012). To this end, some researchers have investigated several potential moderators of the relationship between culture and alcohol use, such as ethnic group, religiosity, and parental attachment (Abdullah & Brown, 2012; Hahm, et al., 2003; Hendershot, et al., 2008; Kulis, Marsiglia, Kopak, Olmsted, & Crossman, 2012). Taking a social ecological perspective (Bronfenbrenner, 1979), other researchers have conceptualized culture as a contextual effects modifier of other lower-level factors such as school, family, and peers (Castro & Alarcón, 2002; Castro, et al., 2009). There have been some research findings supporting this contextual-effects-modifier approach. For example, cultural variables have been shown to moderate the effects of intrapersonal factors such as religiosity and alcohol-related cognition (Brook, Balka, Brook, Win, & Gursen, 1998; Brook & Pahl, 2005; Brook, Whiteman, et al., 1998; Luk, Emery, Karyadi, Patock-Peckham, & King,

2013; Scheier, Botvin, Diaz, & Ifill-Williams, 1997) on alcohol and other substance use among minority adolescents and college students in Western countries. Cultural variables have also been shown to be moderators of interpersonal factors such as peer and parental influences (Brook, Balka, et al., 1998; Brook, Whiteman, et al., 1998; Gazis, et al., 2010) in relation to alcohol and other substance use among American minority adolescents.

Also, scholars have suggested a focus on the mediational mechanism associated with cultural influence on alcohol use (Castro & Alarcón, 2002; Marin, et al., 2003). According to social learning theory (Bandura, 1977), both cognitions and the social environment may serve as mediators of cultural variables. Research has shown that alcohol expectancies (Des Rosiers, Schwartz, Zamboanga, Ham, & Huang, 2013), self-efficacy (Morgan-Lopez, Gonzalez Castro, Chassin, & MacKinnon, 2003), and self-esteem (Zamboanga, Schwartz, Jarvis, et al., 2009) mediated the relationship between cultural variables and alcohol and other substance use among minority adolescents and college students. Also, parental influence (Brook, Balka, et al., 1998) and peer use (Hahm, et al., 2004; Le, et al., 2009; Prado et al., 2009; Thai, et al., 2010; Unger et al., 2000) have been reported to mediate the relationship between acculturation and alcohol and other substance use among minority adolescents. Additionally, some research has shown that certain cultural variables mediated the effects of other cultural variables on alcohol use. For example, acculturative stress (Gil, Wagner, & Vega, 2000; Zamboanga, Schwartz, Jarvis, et al., 2009) and traditional cultural values (Gil, et al., 2000) have been found to mediate the associations between cultural variables (e.g., heritage cultural orientation) and alcohol and other substance use among minority adolescents.

There are several limitations in past research. First, there has been limited research on

potential moderating and mediating mechanisms associated with cultural influence on alcohol use among younger populations. Second, although acculturation has been recognized as a two-dimensional construct involving both Western and heritage culture (Berry, 1997; Oetting & Beauvais, 1990), partly due to the lack of appropriate measures, some research has continued to operationalize acculturation as a one-dimensional construct (Herman-Stahl, et al., 2003). This one-dimensional approach may have partly contributed to the inconsistency in the literature, because it assumes that an increase in acculturation corresponds with a decrease in enculturation. Third, the majority of studies have focused on Western culture-related variables (Luk, et al., 2013; Schwartz, et al., 2013; Thai, et al., 2010), and many fewer have investigated the association between heritage culture and alcohol use (Iwamoto, et al., 2011; Kulis, et al., 2012). However, as researchers have pointed out, both Western and heritage culture may affect alcohol use among minority adolescents and young adults (Prado, et al., 2008; Schwartz, et al., 2010; Unger, 2012). Furthermore, heritage and Western culture may have different effects on alcohol use. For example, research has shown that acculturation was positively associated with alcohol use while enculturation was negatively associated (Cuadrado & Lieberman, 1998; Des Rosiers, et al., 2013). Therefore, more research on heritage culture-related variables is needed. Fourth, there has been a lack of good measurements of culture-related variables (De La Rosa, 2002; Lopez-Class, Castro, & Ramirez, 2011; Oetting, et al., 1998; Salant & Lauderdale, 2003; Thomson & Hoffman-Goetz, 2009). For example, many previous studies have used proxy measures to assess acculturation, such as language use and birth place (Hahm, et al., 2004; Thai, et al., 2010; Unger, et al., 2000), and many studies have operationalized culture as a one-dimensional construct

(Herman-Stahl, et al., 2003). More refined instruments are needed to assess multiple domains of culture such as identification, behaviors, and values (Beauvais, 1998; Unger, 2012). This methodological issue is particularly important for further research, because different domains of culture have been shown to have qualitatively different effects on alcohol use among immigrant adolescents in the U.S. (Schwartz, et al., 2013).

Finally, there has been little research in non-Western younger populations. Because the majority of theoretical evidence has been generated from research in Western populations, this may hinder theory testing and development, and limit our understanding of the similarities and differences in cultural influence on alcohol use between Western and non-Western populations. Although acculturation is often defined as the adoption of the beliefs, values, and behaviors of the host culture by minorities (Berry, Trimble, & Olmedo, 1986), it is essentially a reaction to cultural changes that affects all people who are exposed to changes in culture (Szapocznik, et al., 2007). With the rapid progress of globalization, people living in non-Western societies are experiencing cultural changes largely caused by Westernization or Americanization (Scholte, 2000). Therefore, culture may also affect alcohol use among non-Western populations, and one psychological process may be people's voluntary choice of identification with certain cultures (Arnett, 2002; Schwartz, Montgomery, & Briones, 2006; Schwartz, Unger, Zamboanga, & Szapocznik, 2011). The influence of culture on alcohol use may be more prominent among adolescents and young adults than people of other age groups in non-Western societies because the self-identity exploration process and the initiation of or increase in alcohol and other substance use are co-occurring in these younger populations (Arnett, 2000, 2002).

More recently, theories of acculturation have been extended to globalization (Arnett, 2002; Jensen & Arnett, 2012), and empirical research has supported the significance of culture for health outcomes such as mental health and quality of life in non-Western populations (Chen, et al., 2008; Diaz & Zirkel, 2012). Regarding alcohol consumption, research has shown that traditional culture-related variables were associated with less alcohol use among Zimbabwean (Eide & Acuda, 1996) and Colombian (Brook, Brook, Rosen, & Montoya, 2002) adolescents, but were not significantly associated with drinker types among Chinese adolescents (Qian, Hu, Newman, & Hou, 2008; Shell, Newman, & Xiaoyi, 2010). Also, Western cultural orientation has been shown to be associated with more alcohol use (Eide & Acuda, 1996; Qian, et al., 2008; Shell, et al., 2010) and drug (Eide & Acuda, 1997) among adolescents in Zimbabwe and China.

In summary, research has generally supported the significance of culture for determining alcohol use among minority adolescents and young adults in Western societies. Future research may benefit from focusing on related mediating and moderating mechanisms. Also, more research of adolescents and young adults in non-Western societies is needed.

Perceived peer norms:

Social learning theory (Bandura, 1977; Maisto, et al., 1999) proposes that peer influence is an important part of the social environment affecting people's behaviors. Research has demonstrated that peer influence is a potent risk factor for alcohol use among college students in North America (Baer, 2002; Borsari & Carey, 2001; Ham & Hope, 2003). Peer influence on alcohol use may operate through the direct offer of alcohol, role modeling,

and perceived peer norms (Borsari & Carey, 2001). Among these three forms of peer influence, perceived peer norms, i.e., ratings peers make about the acceptability and typicality of various drinking behaviors (Baer, 2002), have been most often studied in the literature.

Research has frequently shown that the majority of college students overestimated peer norms. The elevated estimation of peer drinking norms among American college students has been demonstrated by research on single colleges (Baer & Carney, 1993; Baer, Stacy, & Larimer, 1991; Perkins & Berkowitz, 1986; Pollard, Freeman, Ziegler, Hersman, & Goss, 2000) and nationally representative samples of colleges (Perkins, Haines, & Rice, 2005; Perkins, Meilman, Leichliter, Cashin, & Presley, 1999). The overestimation of peer norms has also been found in college populations in many other developed countries such as Canada, France, Great Britain, and New Zealand (Fran ça, Dautzenberg, & Reynaud, 2010; Kypri & Langley, 2003; McAlaney & McMahon, 2007; Perkins, 2007). Additionally, the misperceptions of peer norms varied greatly among individual students (Perkins & Wechsler, 1996).

Other studies have yielded results that are inconsistent with findings reported previously. One study of Australian college students has found that participants may not have overestimated peer alcohol use, although heavy drinkers were less likely to perceive that drinking levels of their peers were low (Halim, Hasking, & Allen, 2012). Because most previous research has been conducted in North America, this study indicated that the phenomenon of college students' overestimating peer drinking norms may not be universal. Additionally, some studies have reported that American college students in the Greek system generally accurately estimated peer alcohol use in their houses (Larimer, Irvine, Kilmer, &

Marlatt, 1997) and perceived that alcohol-related problems of their best friends were similar to theirs (Baer & Carney, 1993). One study concluded that most American college students did not overestimate peer norms (Wechsler & Kuo, 2000); nevertheless, this study has been critiqued for several methodological weaknesses and the findings may be unreliable (DeJong, 2003). Taken together, with a few exceptions, most studies have generally supported that the majority of college students perceive that peers drink more than themselves.

Four theories may help to explain the pervasive misperceptions of peer norms in college students (Berkowitz, 2004, 2005). First, false uniqueness effects (Suls & Wan, 1987) help explain why the perceived discrepancy between peer and individual alcohol use in abstainers is larger than the actual case. Research has suggested that people with minor negative attributes tend to falsely perceive their uniqueness for self-serving motivations, which is known as the phenomenon of false uniqueness (Suls & Wan, 1987). Regarding college drinking, the negative attributes may refer to alcohol use and misuse, and false uniqueness effects may be found in the small subgroup of abstainers. Second, light and moderate drinkers may be characterized by the psychological state of pluralistic ignorance (Prentice & Miller, 1993) which usually develops under circumstances in which there are widespread misrepresentations of people's private behaviors and attitudes. These student drinkers tend to perceive that their moderate alcohol use and modest attitudes toward drinking are more conservative than those of peers, even though the actual discrepancies between the two are very small. Third, the small subgroup of heavy drinkers tends to perceive that peers drink as heavily as they do for self-serving motivations, which is known as false consensus effects (Ross, Greene, & House, 1977). False consensus effects are often observed among

people engaging in a behavior and is associated with the number of behavioral choices (Mullen et al., 1985). It has been suggested that the motivational mechanisms of false consensus and false uniqueness are similar, i.e., people are motivated to maintain a positive self image by deviating from social norms in desirable ways, or not deviating from social norms in undesirable ways (Blanton & Christie, 2003). Finally, attribution theory (Ross, 1977) helps to explain the origins of the elevated perceptions of peer norms. College students often have limited information about peers' drinking behaviors; therefore, they tend to perceive peers' excessive drinking in the public as stable behavioral traits rather than behaviors within certain contexts. This attribution error is also an important contributor to the misperceived peer norms among college students.

The misperceptions of peer norms may result in the establishment of unreal and inaccurate norms within communities, and the internalization of and conformity to these inaccurately perceived norms by individuals (Prentice & Miller, 1993). Research has consistently shown that perceived peer norms have had strong effects on college students' drinking behaviors. Perceived peer norms have been associated with quantity of alcohol consumption (Baer, et al., 1991; Clapp & McDonnell, 2000; Larimer, Turner, Mallett, & Geisner, 2004; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Perkins, 2007; Reis & Riley, 2000), heavy drinking (Clapp & McDonnell, 2000; Fran ça, et al., 2010; Yusko, Buckman, White, & Pandina, 2008), and alcohol-related negative consequences among college students (Clapp & McDonnell, 2000; Larimer, et al., 2004; Perkins & Wechsler, 1996; Yusko, et al., 2008). They have also prospectively predicted alcohol use (Carey, Borsari, Carey, & Maisto, 2006; Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006), heavy drinking (Sher & Rutledge,

2007), and alcohol-related negative consequences among college students (Larimer, et al., 2004). Furthermore, perceived peer norms have been shown to be the strongest psychosocial correlates of alcohol use by college students (Dijkstra, Sweeney, & Gebhardt, 2001; Kuther & Timoshin, 2003; Neighbors, et al., 2007; Perkins, 2007; Perkins, et al., 2005; Reis & Riley, 2000; Sher & Rutledge, 2007), and to be more strongly related to alcohol use by college students than the actual peer norms (Perkins, 2007; Perkins, et al., 2005). Exceptions to these findings are rare, although some research with college students has found that perceived peer norms were not significantly related to alcohol-related outcomes (Benton et al., 2006; Read, Wood, & Capone, 2005).

Perceived peer norms can be classified as descriptive and injunctive norms, which refer to perceptions of peer's quantity and frequency of drinking, and perceived peer approval of drinking, respectively (Borsari & Carey, 2003). Compared with descriptive norms, there has been much less research on injunctive norms, and the associations between injunctive norms and alcohol use have been less consistent than those found for descriptive norms. For example, some research has reported that injunctive norms were negatively associated with alcohol use (Chawla, Neighbors, Lewis, Lee, & Larimer, 2007; Neighbors et al., 2008; Rimal, 2008). This suggests that more research on injunctive norms could provide valuable information.

The relative significance of these two types of perceived norms for alcohol use has been mixed. On the one hand, some research has shown that descriptive norms were more influential for alcohol use than injunctive norms. For example, descriptive norms have been found to be associated with alcohol use and binge drinking by college students (Cameron &

Campo, 2006), and predict drinking and heavy drinking by adolescents (Hong, Beaudoin, & Johnson, 2013), while findings for injunctive norms have been non-significant. Descriptive norms have also been shown to be more strongly related to alcohol use among college students than injunctive norms (Neighbors, et al., 2007). On the other hand, some research has shown that injunctive norms were more significant factors for alcohol use than descriptive norms. For example, one study has shown that injunctive norms, but not descriptive norms, were associated with alcohol use among college students (Paek & Hove, 2012). Another study with college students has reported that injunctive norms predicted alcohol use and alcohol-related consequences, while descriptive norms were only associated with concurrent alcohol use (Larimer, et al., 2004). Part of the reason for these inconsistent findings may be due to different operationalizations of injunctive and descriptive norms in research. To further understand the influences of descriptive and injunctive norms on alcohol use among college students, both types of perceived norms need to be investigated. Some research has found that descriptive and injunctive norms were differentially related to alcohol-related outcomes in college students (Cameron & Campo, 2006; Larimer, et al., 2004; Lewis et al., 2010). This suggests that our current knowledge of these two types of perceived norms, particularly the less often studied injunctive norms, is still incomplete.

Descriptive and injunctive norms may also interact with each other to affect alcohol use. For example, some studies have shown that the interaction between descriptive and injunctive norms was significantly related to alcohol use among college students (Lee, Geisner, Lewis, Neighbors, & Larimer, 2007; Rimal, 2008; Rimal & Real, 2003), while others have reported non-significant interaction effects (Rimal & Real, 2005). The theory of

normative social behavior proposes that injunctive norms mainly serve as moderators of descriptive norms, and the combined effects of the two on alcohol use are synergistic (Lapinski & Rimal, 2005). Nevertheless, extant research on the moderating effects of these two types of perceived peer norms is limited, and more empirical evidence is needed to support this proposition.

Based on the evidence that most college students overestimated peer drinking norms, and perceived peer norms were concurrently and prospectively related to alcohol use among college students, the social norms approach (Berkowitz, 2004, 2005) has been developed to reduce college drinking by correcting misperceptions of peer norms. In 2002, about half of the colleges in the U.S. had implemented social norms marketing (Wechsler, Seibring, Liu, & Ahl, 2004), but the efficacy of social norms interventions has not been fully established. Some studies have supported the social norms approach (Borsari & Carey, 2000; DeJong et al., 2006), while others have not (DeJong et al., 2009; Wechsler et al., 2003). Overall, there has been mixed evidence for social norms marketing (Lewis & Neighbors, 2006; Toomey, Lenk, & Wagenaar, 2007), but the short-term effects of certain types of personalized normative feedback interventions for some students has been supported (Moreira, Smith, & Foxcroft, 2009).

The typical student on campus has been commonly used as the normative referent in social norms interventions. However, research has suggested that specificity of peer referents needs to be considered in interventions. For example, gender-specific norms have been shown to be more strongly associated with alcohol use among college students than gender non-specific norms (Lewis & Neighbors, 2004). Perceived descriptive norms of peer referents

specified in gender, ethnicity, and residence have been shown to be more accurate than those of the typical student (Larimer et al., 2011), and have been shown to affect alcohol use by college students independent of the influences of perceived norms of the typical student (Larimer et al., 2009).

Research has also suggested that social norms interventions may benefit from using proximal, rather than distal referents. For example, compared with perceived norms of distal referents such as the typical student, perceived injunctive (LaBrie, Hummer, Neighbors, & Larimer, 2010) and descriptive norms of proximal referents such as close friends (Baer, et al., 1991; Campo et al., 2003; Korcuska & Thombs, 2003; Thombs, Ray-Tomasek, Osborn, & Olds, 2005; Yanovitzky, Stewart, & Lederman, 2006) have been found to be more strongly associated with college students' drinking behaviors. This strategy of using proximal peer referents in norms-based interventions is also consistent with the proposition in social identity and social comparison theories that socially proximal referents generally have greater influences on people's behaviors than distal referents (Festinger, 1954; Tajfel, 1982).

Additionally, research on moderators of perceived peer norms has revealed several factors that may contribute to effective interventions. For example, college men and women have been reported to differ in perceptions of peer norms (Carey, et al., 2006; M. A. Lewis & C. Neighbors, 2006; Suls & Green, 2003), and perceived peer norms have been shown to have stronger effects on alcohol use in college men (Larimer, et al., 2004; Read, Wood, Davidoff, McLacken, & Campbell, 2002) or, conversely, women (Lewis & Neighbors, 2004). This suggests that gender differences need to be considered in social norms interventions. For another example, alcohol expectancies (Rimal, 2008; Rimal & Real, 2005), group identity

(Johnston & White, 2003; Lewis, et al., 2010; Reed, Lange, Ketchie, & Clapp, 2007; Rimal, 2008; Rimal & Real, 2005), and injunctive norms (Rimal, 2008; Rimal & Real, 2003) have been shown to moderate the effects of descriptive norms on alcohol use by college students. Attitudes toward drinking (Perkins & Wechsler, 1996) and social motives (Halim, et al., 2012; Lee, et al., 2007) have also been found to be moderators of perceived peer norms. These moderating variables may also help to inform effective interventions; because these interactive effects have been inconsistently reported and generally small in magnitude (Rimal, 2008; Rimal & Real, 2003), however, further research is needed.

Finally, research on mediators of perceived peer norms has suggested several mediating variables helpful for informing effective interventions. For example, alcohol expectancies have been shown to mediate the effects of perceived peer norms on alcohol use (Rimal, 2008; Scheier & Botvin, 1997; Webb, Baer, Francis, & Caid, 1993; Zamboanga, Schwartz, Ham, Jarvis, & Olthuis, 2009) and alcohol-related problems among college students (Fearnow-Kenny, Wyrick, Hansen, Dyreg, & Beau, 2001). Also, social motives have been found to be mediators of descriptive and injunctive norms (Halim, et al., 2012), and injunctive norms have been reported to be mediators of descriptive norms (Rimal, 2008). These findings suggest that the effectiveness of social norms interventions may be improved by addressing both injunctive and descriptive norms, and incorporating an element of expectancy challenge (Jones, 2004) into the interventions.

In summary, research has shown that the overestimation of peer drinking norms in college students has been a potent factor affecting alcohol use, and social norms interventions may help to reduce harmful drinking in college students. Future research may benefit from

further investigation of injunctive norms, specificity of peer referents, and potential moderators and mediators of perceived peer norms. The generalizability of these findings to college student populations in cultures other than the U.S. is also needed.

Alcohol expectancies:

Alcohol expectancies are individuals' specific beliefs about the behavioral, emotional, and cognitive effects of alcohol consumption (Baer, 2002). Alcohol expectancy theory proposes that expectancy is a fundamental cognitive process guiding people's current and future behaviors (Goldman, 1994, 2002; Goldman, et al., 1991), and alcohol expectancies are major motivations for drinking that are inherently associated with affect and personality (Goldman, et al., 1999).

Furthermore, alcohol expectancies are considered to be not only alcohol-related outcome beliefs, but also hierarchically stored information nodes in long-term memories (Del Boca, Darkes, Goldman, & Smith, 2002; Goldman, et al., 1991; Goldman, et al., 1999). If there is an approximate match between the information templates stored in memories and newly encountered circumstances, drinking behaviors will be performed according to those effective in previous circumstances (Goldman, 1994, 2002; Goldman, et al., 1991; Goldman, et al., 1999). Supporting this conceptualization of alcohol expectancies, research using multidimensional scaling (Stacy, 1997) and implicit measures of cognitions (Wiers, Van Woerden, Smulders, & De Jong, 2002) has revealed that alcohol expectancies include an explicit (outcome expectations) and an implicit component (memory associations). The hierarchical model of alcohol expectancies has also been supported by confirmatory factor

analysis (Goldman, Greenbaum, & Darkes, 1997), and has been shown to perform better than (Darkes, Greenbaum, & Goldman, 2004), or equivalently to (Gullo, Dawe, Kambouropoulos, Staiger, & Jackson, 2010) the unidimensional expectancy factor in mediating the effects of personality on alcohol use.

Although alcohol expectancies are commonly defined as outcome expectations about alcohol use, they are distinct from attitude, i.e., beliefs about behavioral consequences and individuals' evaluations of these consequences (Ajzen, 1991). Attitude is a unidimensional construct with the underlying determinants being behavioral and normative beliefs, whereas alcohol expectancies are multidimensional constructs which include conceptually and methodological distinct factors such as positive and negative outcome expectancies, positive and negative reinforcing expectancies, and arousing and sedating expectancies (Goldman, et al., 1999). The distinctiveness of these two constructs has been supported by research. For example, alcohol expectancies have explained additional variance in alcohol use by adolescents (Christiansen & Goldman, 1983) and college students (Leigh, 1989), independent of the influence of attitude. Both attitude and evaluations of alcohol expectancies have been shown to predict alcohol use among college students (Burden & Maisto, 2000). Some research upon college students has also reported that alcohol expectancies were better predictors of intention to drink than attitude (Stacy, Widaman, & Marlatt, 1990), and were related to excessive alcohol use while attitude was only related to intention to drink (Wall, Hinson, & McKee, 1998).

Stemming from social learning theory (Bandura, 1977), alcohol expectancy theory assumes that alcohol expectancies are developed from individuals' direct or indirect learning

experiences with drinking, and are influenced by factors affecting learning processes (Oei & Baldwin, 1994). One major difference between the two theories is the temporal association between alcohol expectancies and alcohol use. Social learning theory assumes a reciprocal relationship between cognitions and behaviors (Bandura, 1977). Therefore, alcohol expectancies should predict future alcohol use, and previous drinking experiences should affect changes in alcohol expectancies. Alcohol expectancy theory emphasizes that alcohol expectancies are determinants of alcohol use and are primary mediators linking the associations between antecedents (e.g., family history of alcoholism) and alcohol use (Goldman, et al., 1999). There has been empirical evidence for both propositions. Some research has found the reciprocal relationship between alcohol expectancies and alcohol use among college students (Sher, Wood, Wood, & Raskin, 1996). Also, a substantial amount of research upon adolescents and college students has provided evidence for the proposition that alcohol expectancies are causally related to alcohol use (Goldman, et al., 1999).

First, cross sectional research has shown that alcohol expectancies were significantly related to alcohol use (Baldwin & Oei, 1993; Cronin, 1997; Dijkstra, et al., 2001; Evans & Dunn, 1995; Gilles, Turk, & Fresco, 2006; Kuther & Timoshin, 2003; Leigh & Stacy, 1993; Oei & Burrow, 2000; Park & Levenson, 2002; Reis & Riley, 2000; Werner, Walker, & Greene, 1993; Young, et al., 2006), heavy drinking (Des Rosiers, et al., 2013; Wall, et al., 1998), and alcohol-related negative consequences (Evans & Dunn, 1995; Gilles, et al., 2006; Leigh, 1989; Turrisi, Wiersma, & Hughes, 2000; Werner, et al., 1993; Young, et al., 2006) among college students.

Second, prospective research has shown that alcohol expectancies predicted alcohol

use (Burden & Maisto, 2000; Carey, 1995; Kidorf, Sherman, Johnson, & Bigelow, 1995; Sher, et al., 1996; Stacy, et al., 1990), heavy drinking (Zamboanga, Horton, Leitkowski, & Wang, 2006), growth factors for the trajectory of alcohol use over time (Del Boca, Darkes, Greenbaum, & Goldman, 2004), and negative consequences (Thompson et al., 2009) among college students, as well as alcohol use (Christiansen, Smith, Roehling, & Goldman, 1989) and heavy drinking (K. W. Griffin, Botvin, Epstein, Doyle, & Diaz, 2000) among adolescents. Alcohol expectancies during adolescence have also been shown to predict alcohol use in adulthood (Patrick, Wray-Lake, Finlay, & Maggs, 2010).

Third, mediational models have shown that alcohol expectancies mediated the effects of personality variables on alcohol use among college students (Darkes, et al., 2004; Gullo, et al., 2010; Henderson, Goldman, Coovert, & Carnevalla, 1994), young adults (Finn, Sharkansky, Brandt, & Turcotte, 2000), and adolescents (Urban, Kokonyei, & Demetrovics, 2008); they also mediated the effects of genetic factors on alcohol use among college students (Hendershot et al., 2009). Alcohol expectancies also mediated the effect of social anxiety on risky drinking by college students (Ham, 2009), and mediated the effects of peer influence on alcohol use among college students (Fearnow-Kenny, et al., 2001; Wood, Read, Palfai, & Stevenson, 2001) and adolescents (Scheier & Botvin, 1997; Webb, et al., 1993; Zamboanga, Schwartz, Ham, et al., 2009). Additionally, alcohol expectancies have also been found to mediate the influence of the protective factor of religiosity on alcohol use among college students (Darkes, et al., 2004; Galen & Rogers, 2004). Finally, the short-term effects of expectancy challenge (Darkes & Goldman, 1993) for reducing alcohol use among college students have been supported by reviews (Labbe & Maisto, 2011; Scott-Sheldon, Terry, Carey,

Garey, & Carey, 2012). Thus, research has generally suggested that alcohol expectancies are determinants of alcohol use by adolescents and college students.

Regarding the comparative significance of alcohol expectancies and other psychosocial factors for alcohol use, research has shown that the influences of alcohol expectancies on alcohol use among college students were less potent than those of perceived norms (Dijkstra, et al., 2001; Kuther & Timoshin, 2003; Neighbors, et al., 2007; Reis & Riley, 2000) and drinking motives (Cronin, 1997; Galen & Rogers, 2004; Hatzenbuehler, Corbin, & Fromme, 2011; Williams & Clark, 1998), but were stronger than those of demographic variables (Brown, 1985) and coping strategies (Evans & Dunn, 1995; Park & Levenson, 2002). The relative significance of alcohol expectancies and drinking refusal self-efficacy for alcohol use has been less consistent. Some research has shown that the effects of alcohol expectancies on alcohol use were equivalent to (Kuther & Timoshin, 2003), or more potent than those of drinking refusal self-efficacy (Evans & Dunn, 1995), while other research has reported that drinking refusal self-efficacy was more strongly associated with alcohol use than alcohol expectancies (Gullo, et al., 2010; Oei & Burrow, 2000).

Alcohol expectancies are multi-dimensional constructs, and positive and negative expectancies have been the most often studied global expectancy factors. Positive and negative expectancies refer to beliefs about the positive and negative effects of alcohol use, respectively (Goldman, et al., 1999). Positive expectancies are associated with the initiation and maintenance of alcohol consumption, whereas negative expectancies are related to restraint from drinking (Jones, Corbin, & Fromme, 2001). These two types of alcohol expectancies have been found to be positively (Stacy, et al., 1990; Urban, et al., 2008;

Zamboanga, Horton, et al., 2006) or negatively (Leigh & Stacy, 1993) weakly correlated. Partly due to the widespread use of the alcohol expectancy questionnaire (Brown, Goldman, Inn, & Anderson, 1980) in past research, positive expectancies have been more often studied and supported than negative expectancies. Nevertheless, negative expectancies have also been shown to affect alcohol use among community (McMahon, Jones, & O'donnell, 1994) and college student drinkers (Leigh & Stacy, 1993; Stacy, et al., 1990).

It is more appropriate to study both positive and negative expectancies in research, because evidence has suggested that the investigation of only one type of these expectancies may lead to biased conclusions. As one study with nationally representative Americans aged 12 and older has reported, the explanatory power of positive and negative expectancies was dependent on whether both types of these expectancies were included in analyses (Leigh & Stacy, 2004). Several instruments are available to measure positive expectancies (Brown, et al., 1980), negative expectancies (McMahon, et al., 1994), positive and negative expectancies (Leigh & Stacy, 1993; Young & Knight, 1989), and positive and negative expectancies and evaluations of these expectancies (Fromme, Stroot, & Kaplan, 1993).

The majority of studies have shown that positive expectancies were more influential for alcohol use than negative expectancies, which may be due to the stronger associations between immediate positive effects and alcohol use than those between delayed negative effects and alcohol use, and the easier accessing of positive expectancies from memory than negative expectancies (Jones, et al., 2001). For example, positive expectancies, but not negative expectancies, have predicted alcohol use and misuse among adolescents (Patrick, et al., 2010) and alcohol use among college students (Zamboanga, Horton, et al., 2006). Positive

expectancies, not negative expectancies, have been associated with alcohol use, heavy drinking, and alcohol-related problems among college students (Wall, et al., 1998; Young, et al., 2006). Positive expectancies have also been shown to be stronger correlates (Leigh & Stacy, 1993) and predictors (Stacy, et al., 1990) of alcohol use by college students than negative expectancies.

Nonetheless, some studies have also reported that negative expectancies were as influential as positive expectancies in relation to alcohol use. For example, both positive and negative expectancies have been found to mediate the effects of perceived peer norms on alcohol use among adolescents (Zamboanga, Schwartz, Ham, et al., 2009). Positive and negative expectancies have been found to be related to quantity and frequency, respectively, of alcohol use in community drinkers, respectively (Lee, Greely, & Oei, 1999). The strengths of the associations between positive or negative expectancies and alcohol use among college students (Kuther & Timoshin, 2003) and community drinkers (Oei, Fergusson, & Lee, 1998) have been found to be approximately equal. Positive and negative expectancies have been shown to have similarly potent effects on alcohol use among Americans among the older age groups (Leigh & Stacy, 2004). Also, some studies have reported that negative expectancies had stronger effects on alcohol use among community drinkers than positive expectancies (Engels, Wiers, Lemmers, & Overbeek, 2005; McMahon & Jones, 1994; McMahon, et al., 1994).

Finally, research with Chinese adolescents has supported the distinction between positive and negative expectancies (Shell, Newman, & Qu, 2009), and both types of alcohol expectancies have been shown to be related to drinker types (Qian, et al., 2008; Shell, et al.,

2009; Shell, et al., 2010). Positive expectancies, but not negative expectancies, have been found to mediate the effects of impulsivity on alcohol use among college students in Taiwan (Fu, Ko, Wu, Cherng, & Cheng, 2007). These studies suggested that more research on the effects of alcohol expectancies on alcohol use among Chinese college students is needed.

In summary, research has demonstrated that alcohol expectancies are significant factors affecting alcohol use among college students. The efficacy of expectancy challenge has also been supported in college students. Future research on alcohol expectancies may benefit from investigating both positive and negative expectancies, and including other important alcohol-related psychosocial factors such as peer influence and drinking refusal self-efficacy. Additionally, age (Jones, et al., 2001; Leigh & Stacy, 2004) and gender (K. W. Griffin, et al., 2000; Jones, et al., 2001; Kidorf, et al., 1995; Patrick, et al., 2010; Read, Wood, Lejuez, Palfai, & Slack, 2004; Thombs, 1993; Thompson, et al., 2009) have been found to be moderators of alcohol expectancies and need further investigation.

Drinking refusal self-efficacy:

The concept of drinking refusal self-efficacy has been closely related to alcohol expectancies. Based on the conceptualization of outcome expectancies and self-efficacy in social learning theory (Bandura, 1977; Maisto, et al., 1999), Oei and colleagues proposed a cognitive model of alcohol use, stating that both alcohol expectancies and drinking refusal self-efficacy are important determinants of alcohol use (Oei & Baldwin, 1994; Oei & Morawska, 2004). They proposed that drinking refusal self-efficacy may mediate (Oei & Baldwin, 1994) or moderate (Hasking & Oei, 2008; Oei & Morawska, 2004) the effects of

alcohol expectancies on alcohol use.

Drinking refusal self-efficacy refers to the perceived ability to refuse drinking in specific high risk situations (Lee & Oei, 1993; Young, Oei, & Crook, 1991). This construct was first studied in clinical patients; in clinical research, it is also defined as perception of one's ability not to give in to urges or social pressures to engage in heavy drinking in high risk situations (Marlatt & Gordon, 1985). A substantial amount of research has shown that drinking refusal self-efficacy prospectively predicted relapse (Kavanagh et al., 2006; Solomon & Annis, 1990; Witkiewitz, Donovan, & Hartzler, 2012), and drinking refusal self-efficacy has been identified as a consistent predictor of treatment outcomes (Adamson, Sellman, & Frampton, 2009).

Much less research has studied drinking refusal self-efficacy in community and college student samples than in patients. Nevertheless, evidence has generally supported the significance of drinking refusal self-efficacy for alcohol use among non-clinical populations. For example, drinking refusal self-efficacy has been negatively related to alcohol use (Baldwin & Oei, 1993; Cicognani & Zani, 2011; Ehret, Ghaidarov, & LaBrie, 2013; Evans & Dunn, 1995; Gilles, et al., 2006; Kuther & Timoshin, 2003; Oei & Burrow, 2000; Oei & Jardim, 2007; Young, et al., 2006), risky drinking (Gullo, et al., 2010), and alcohol-related problems (Cicognani & Zani, 2011; Ehret, et al., 2013; Evans & Dunn, 1995; Gilles, et al., 2006; Young, et al., 2006) among college students. Drinking refusal self-efficacy has also been negatively related to alcohol use by community drinkers (Engels, et al., 2005; Hasking & Oei, 2002; Lee & Oei, 1993; Oei, et al., 1998; Oei, Hasking, & Phillips, 2007) and negatively related to adolescents' intention to drink (Aas, Klepp, Laberg, & Aarø, 1995).

Consistent with its definition, drinking refusal self-efficacy has been shown to be behavior and situation specific, rather than general. For example, drinking refusal self-efficacy has been related to alcohol use, but not other substance use in college students (Oei & Burrow, 2000). Depressed mood has been found to decrease self-efficacy in high risk drinking contexts related to depression, but not self-efficacy in other high risk drinking contexts among college students (Ralston & Palfai, 2010). Also, research with community samples of social drinkers has shown that drinking refusal self-efficacy was related to alcohol use (Oei, et al., 1998; Oei, et al., 2007), while general self-efficacy was not (Oei, et al., 2007).

Additionally, research has shown that, for college students, the effects of drinking refusal self-efficacy on alcohol use were weaker than those of peer norms (Cicognani & Zani, 2011) but were stronger than those of protective behavioral strategy (Ehret, et al., 2013). The relative significance of drinking refusal self-efficacy and alcohol expectancies for alcohol use has been less consistent. Some research with adolescents and college students has shown that strengths of the associations between the two constructs and alcohol use were approximately equal (Kuther & Timoshin, 2003), while other research has reported that the effect of drinking refusal self-efficacy on alcohol use was weaker (Aas, et al., 1995; Evans & Dunn, 1995) or stronger (Engels, et al., 2005; Gullo, et al., 2010; Oei & Burrow, 2000; Oei, et al., 2007) than that of alcohol expectancies. It is possible that the salience of drinking refusal self-efficacy and alcohol expectancies for alcohol use may vary across samples, and the more important issue is whether drinking refusal self-efficacy may serve as a moderator of alcohol expectancies, as has been proposed by the cognitive model of alcohol use (Hasking & Oei, 2008; Oei & Morawska, 2004).

There has been some empirical evidence for this moderated effect. For example, significant interactions between drinking refusal self-efficacy and alcohol expectancies have been reported by studies in Australian college students (Oei & Jardim, 2007), American college students with low social anxiety (Gilles, et al., 2006), and community drinkers and clinical patients (Hasking & Oei, 2002). Additional research has indicated the interactions, as both drinking refusal self-efficacy and alcohol expectancies were needed to discriminate different drinker types in college students (Morawska & Oei, 2005), community social drinkers (Lee, et al., 1999), and alcoholics (Skutle, 1999). Additionally, drinking refusal self-efficacy has been found to moderate the effects of peer influence (Stacy, Suassman, Dent, Burton, & Flay, 1992) and protective behavioral strategy (Ehret, et al., 2013) on alcohol use, thus further supporting the protective role of drinking refusal self-efficacy in alcohol use.

Finally, research has shown that drinking refusal self-efficacy may serve as a mediator of other factors in relation to alcohol use. For example, drinking refusal self-efficacy has been shown to mediate the effects of interventions on alcohol use (Komro, et al., 2001; Witkiewitz, et al., 2012). Furthermore, research has shown that drinking refusal self-efficacy mediated the effects of impulsivity (Gullo, et al., 2010), alcohol expectancies (Gullo, et al., 2010), and self-regulation (Cho, 2007) on alcohol use. There has also been some research indicating the meditational role of drinking refusal self-efficacy in the associations between depression (Ralston & Palfai, 2010) and alcohol expectancies (Oei & Burrow, 2000) and alcohol use.

To summarize, drinking refusal self-efficacy has been less often studied than alcohol expectancies in college students. Extant research has supported that drinking refusal self-efficacy may affect alcohol use among college students both directly and indirectly

through moderating the effects of other factors such as alcohol expectancies. Therefore, one focus in future research should be the potential moderating and mediating mechanisms associated with drinking refusal self-efficacy. Drinking refusal self-efficacy has been shown to be negatively related to drinker types, and mediate the effects of distal psychosocial factors on drinker types in Chinese adolescents (Qian, et al., 2008; Shell, et al., 2010). Whether drinking refusal self-efficacy affects alcohol use by Chinese college students still needs to be evaluated.

Drinking motives:

Drinking motives refer to the needs or psychological functions that alcohol consumption fulfills (Baer, 2002). The motivational model of alcohol use (Cox & Klinger, 1988, 2004) assumes that people are motivated to consume alcohol to gain affective changes, and motives for drinking are the final common pathways to alcohol use. This model emphasizes that alcohol drinking should be viewed within the context of other incentives in people's life, and a variety of factors may affect people's motivations to drink, including biological, psychological, environmental, and cultural factors. Together, these factors contribute to the expectations about how alcohol consumption may lead to affective changes, which, in turn, affect motivations for drinking. Therefore, alcohol use is a result of the totality of people's current goal pursuits called the motivational structure (Cox & Klinger, 1988, 2004). The motivational model of alcohol use considers that alcohol expectancies are among various psychological factors affecting drinking motives; people holding certain outcome expectancies may not necessarily be motivated to drink because the final decision to drink is

based on the motivational structure (Cox & Klinger, 1988, 2004).

Several scales have been developed to measure drinking motives. Cox and colleagues have developed the Motivational Structure Questionnaire to measure the maladaptive and adaptive motivational structure proposed in the motivational model of alcohol use (Klinger, Cox, & Blount, 1995). These two types of motivational structure have also been shown to be related with affective changes and alcohol use by college and clinical samples (Cox & Klinger, 2002; Cox et al., 2002). However, the Drinking Motives Questionnaire (DMQ) (Cooper, Russell, Skinner, & Windle, 1992) and the Drinking Motives Questionnaire-Revised (DMQ-R) (Cooper, 1994) developed by Cooper and colleagues have been the most widely used instruments (Kuntsche, Knibbe, Gmel, & Engels, 2005). Based on the two dimensions of drinking motives (i.e., valence and resources) proposed by the motivational model of alcohol use, the DMQ-R was developed to measure four types of drinking motives, i.e., social (externally driven motives for positive reinforcement), conformity (externally driven motives for negative reinforcement), enhancement (internally driven motives for positive reinforcement), and coping motives (internally driven motives for negative reinforcement).

Research with adolescents (Kuntsche & Kuntsche, 2009; Mazzardis, Vieno, Kuntsche, & Santinello, 2010) and college students (MacLean & Lecci, 2000; Martens, Rocha, Martin, & Serrao, 2008) has shown that the four types of drinking motives measured by the DMQ-R were positively correlated with each other. Compared with the two negative reinforcement motives (coping and conformity), the two positive reinforcement motives (social and enhancement) have been more often endorsed by adolescents (Kuntsche, Knibbe, Engels, & Gmel, 2007; Kuntsche, Wiers, Janssen, & Gmel, 2010) and college students (Cronin, 1997;

LaBrie, Hummer, & Pedersen, 2007; Martens, Cox, Beck, & Heppner, 2003; Stewart, Zeitlin, & Samoluk, 1996). Compared with the two externally-driven motives (social and conformity), the two internally-driven motives (enhancement and coping) have been less likely to vary across situations and have been more closely tied with personality variables (Kuntsche, von Fischer, & Gmel, 2008; Stewart, Loughlin, & Rhyno, 2001).

Social motives have been the most often reported drinking motives in adolescents and young adults (Kuntsche, et al., 2005). They have generally been associated with alcohol use, but not with risky drinking, alcohol abuse, and alcohol-related problems (Cooper, 1994; Cooper, et al., 1992; Kuntsche, Knibbe, Gmel, & Engels, 2006; Kuntsche & Kuntsche, 2009; Williams & Clark, 1998). Additionally, possibly due to the social nature of alcohol use among adolescents and college students, some research has also reported that social motives were related to binge drinking (Cronin, 1997), alcohol misuse (Bradizza, Reifman, & Barnes, 1999), and alcohol-related problems (LaBrie, et al., 2007) among these younger drinkers.

Enhancement motives have been found to be particularly influential for heavy drinking (Kuntsche, et al., 2005). Enhancement motives have been found to be the strongest correlates of risky drinking by adolescents (Kuntsche, et al., 2006; Kuntsche & Kuntsche, 2009; Kuntsche, Stewart, & Cooper, 2008) and college students (Tartaglia, 2013). Enhancement motives, but not other types of drinking motives, have been associated with social heavy drinking among college students (Gonzalez, Collins, & Bradizza, 2009). Additionally, enhancement motives have been found to be associated with alcohol use (Cooper, 1994; Kuntsche & Kuntsche, 2009; Kuntsche, Stewart, et al., 2008; Martens, et al., 2003) and alcohol-related problems (Cronin, 1997; Kuntsche, et al., 2006; Magid, Maclean, & Colder,

2007) in adolescents and college students.

Coping motives are particularly important for alcohol-related problems. For example, research has shown that coping motives were the only significant drinking motives (Kassel, Jackson, & Unrod, 2000; Kuntsche & Kuntsche, 2009) and the strongest factors (Kuntsche, et al., 2006; Kuntsche, Stewart, et al., 2008; Neighbors, et al., 2007) associated with alcohol-related problems among adolescents and college students. Coping motives have also been reported to mediate the effects of personality (Littlefield, Sher, & Wood, 2010; Stewart, et al., 2001), negative affect (Simons, Gaher, Correia, Hansen, & Christopher, 2005), social anxiety (Lewis et al., 2008), and religiosity (Johnson, Sheets, & Kristeller, 2008) on alcohol-related problems among college students. Also, research with community and clinical samples has reported that coping motives were associated with alcohol abuse and dependence (Carpenter & Hasin, 1998; Carpenter & Hasin, 1999; Cooper, Russell, & George, 1988), suggesting that drinking to cope is also associated with problematic alcohol-related outcomes in populations other than college students. Additionally, coping motives have also been found to be related to alcohol use (Kuntsche & Kuntsche, 2009; Kuntsche, Stewart, et al., 2008) and heavy drinking (Gonzalez, et al., 2009; Ham, Zamboanga, Bacon, & Garcia, 2009; Kuntsche, et al., 2006; Kuntsche, Stewart, et al., 2008) among adolescents and college students.

Conformity motives have been less often studied than the other three types of drinking motives. This may be partly due to the low endorsement of conformity motives in adolescents and young adults than other drinking motives (Kuntsche, et al., 2005), and the fact that conformity motives are not measured by several instruments such as the DMQ (Cooper, et al., 1992) and the reasons for drinking scale (Cronin, 1997). Empirical research has shown that

conformity motives were negatively related to alcohol use (Cooper, 1994; Kuntsche, et al., 2006; Kuntsche, Stewart, et al., 2008; Mazzardis, et al., 2010; Neighbors, et al., 2007), and positively related to alcohol-related problems (Kuntsche, et al., 2010; Magid, et al., 2007) among adolescents and college students.

Supporting the motivational model of alcohol use (Cox & Klinger, 1988), there has been some evidence showing that drinking motives were more influential for alcohol use than other more distal factors. For example, drinking motives have been found to be more strongly associated with alcohol use and heavy drinking by adolescents and college students than alcohol expectancies (Cronin, 1997; Kuntsche, et al., 2007; Williams & Clark, 1998). Among various factors investigated such as demographics, alcohol expectancies, and perceived peer norms, coping motives have been shown to be the strongest correlates of alcohol-related problems (Neighbors, et al., 2007) and alcohol abuse (Cooper, et al., 1988). Compared with alcohol expectancies, coping motives have been shown to be the only significant (Hatzenbuehler, et al., 2011) and consistently strong (Galen & Rogers, 2004) mediators of the associations between related antecedents and alcohol-related problems.

Also, the proposition that drinking motives are mediators of other distal factors for alcohol use (Cox & Klinger, 1988) has been generally supported. For example, coping and enhancement motives have been shown to mediate the effects of personality on alcohol-related problems and alcohol use, respectively, among college students (Littlefield, et al., 2010; Read, Wood, Kahler, Maddock, & Palfai, 2003; Simons, et al., 2005; Stewart, et al., 2001). Drinking motives have been shown to mediate the effects of alcohol expectancies on alcohol use, heavy drinking, and alcohol-related problems among adolescents and college

students (Kuntsche, et al., 2007; Kuntsche, et al., 2010; Read, et al., 2003; Urban, et al., 2008). Research has also reported that drinking motives, particularly enhancement and coping motives, mediated the associations between social anxiety (Buckner, Eggleston, & Schmidt, 2006; Ham, et al., 2009; Lewis, et al., 2008; Norberg, Norton, Olivier, & Zvolensky, 2010) and stressors (Hatzenbuehler, et al., 2011) and risky drinking and alcohol-related problems among college students. Additionally, drinking motives have also been found to mediate the effects of the protective factor of religiosity on alcohol use (Galen & Rogers, 2004; Johnson, et al., 2008). It should be noted that partial mediations have been reported in most related research, suggesting that drinking motives may be a major, but not final, common pathway to alcohol use.

Supporting the motivational model of alcohol use, the systematic motivational counseling developed to change the maladaptive and adaptive motivational structures has been shown to be associated with changes in affect and substance use in clinical samples (Cox & Klinger, 2002). Thus, taken together, previous research has generally supported that drinking motives are potent factors affecting alcohol use by adolescents and college students, and drinking motives are generally more influential for alcohol use than other more distal factors (e.g., alcohol expectancies). Nonetheless, there has also been some research showing that drinking motives explained little additional variance in alcohol use among adolescents and adults, independent of the influences of alcohol expectancies and drinking refusal self-efficacy (Engels, et al., 2005). Some researchers have also suggested that the definitions of drinking motives and alcohol expectancies are very similar, and more research is needed to provide evidence for the construct validity of the two (Goldman, et al., 1999; Jones, et al.,

2001).

There has been much less research on drinking motives than alcohol expectancies; future research on drinking motives should continue to include other significant alcohol-related factors such as alcohol expectancies. Additionally, most prior research on drinking motives has been conducted with adolescents and college students in North America (Kuntsche, et al., 2005), and more research upon college populations in other cultures is needed. Although there has been evidence suggesting that the concept of drinking motives is applicable to adolescents and college students in cultures other than the U.S. (Hauck-Filho, Teixeira, & Cooper, 2012; Kuntsche, et al., 2006; Mazzardis, et al., 2010), there has also been some research indicating cultural differences in drinking motives (Gire, 2002; Nagoshi, Nakata, Sasano, & Wood, 1994; Van Damme et al., 2013). Whether findings obtained from research conducted in North America are generalizable to other cultures still warrants more empirical evidence.

In conclusion, based upon the above literature review of the five psychosocial correlates of alcohol use by adolescents and college students, several gaps in previous research were identified. One of these is that there has been limited research on these correlates in college students outside North America, particularly those of non-Western societies. Also, the literature has suggested the necessity of multivariate research. Thus, guided by the general theoretical framework of the social ecological model and related specific theories, and based on empirical evidence gained largely from research on college drinking in the U.S. and related evidence in Chinese adolescents (Qian, et al., 2008; Shell, et al., 2010), we conducted three studies with a Chinese college sample to contribute to theory

testing and development and inform interventions for Chinese college students.

Specifically, we aimed to address three major research goals in each of the three studies. To address the gap that there has been limited research on mechanisms related to the influence of culture on alcohol use, the primary goal of Study 1 was to examine the potential moderating role of culture in the relationship between peer influence and alcohol use. Study 2 investigated perceptions of peer drinking norms among Chinese college students and the relationship between perceived peer norms and alcohol use. Based on the literature review, specificity of peer referents (e.g., distal and proximal referents) was taken into account; potential mediators of perceived peer norms were tested. Due to the low reliability of the measure of injunctive norms (stability coefficients were below .50), only descriptive norms were analyzed and reported. Finally, Study 3 focused on the possible moderating effect of drinking refusal self-efficacy on the association between alcohol expectancies and alcohol use, and the mediating effects of drinking motives on the relationship between alcohol expectancies and drinking refusal self-efficacy and alcohol use. The background, methods, and findings of these three studies are described in the following sections.

STUDY 1. Western cultural orientation: A contextual effects modifier and antecedent of peer influence in relation to alcohol use among undergraduate students in China

Introduction

Culture has been recognized as an important issue in relation to alcohol and other substance use among minority adolescents in Western societies (Prado, et al., 2008; Szapocznik, et al., 2007). Though most related research has focused on minority adolescents (Brook & Pahl, 2005; Zamboanga, Raffaelli, et al., 2006), the literature has demonstrated that culture affects alcohol use by minority college students as well. For example, cultural variables have been shown to be related to alcohol use (Abdullah & Brown, 2012; Hendershot, et al., 2008), heavy drinking (Hendershot, et al., 2005), and alcohol-related problems (Des Rosiers, et al., 2013) among American minority college students. In view of the great impact of Western culture on many non-Western societies in an era of globalization (Scholte, 2000), as well as the predominance of traditional culture in these societies, a related question is whether traditional culture protects against, while Western culture contributes to, alcohol use among college students in non-Western countries, as has been suggested by the bulk of research with minority adolescents and college students in Western countries (Hendershot, et al., 2005; Le, et al., 2009; Unger, et al., 2002). Though still scarce, research on the influence of culture on college drinking in non-Western societies may make important contributions to theory development. Moreover, such research may contribute to global health, as alcohol use among college populations has become a significant issue around the world (Karam, et al., 2007).

Acculturation is a reaction to cultural changes that affects all people who are exposed to changes in culture (Szapocznik, et al., 2007). More recently, theories of acculturation have been extended to globalization (Arnett, 2002; Jensen & Arnett, 2012) and empirical research has supported the significance of culture for the health outcomes of non-Western populations (Chen, et al., 2008; Diaz & Zirkel, 2012). Regarding alcohol use, traditional and Western cultural orientations have been shown to be associated with alcohol use among Chinese adolescents (Qian, et al., 2008; Shell, et al., 2010) and college students (Tang, Xiang, et al., 2013), and Zimbabwean adolescents (Eide & Acuda, 1996; Eide, Acuda, Khan, Aaroe, & Loeb, 1997). Cultural variables have also been reported to be related to marijuana use among Colombian adolescents (Brook, et al., 2002). However, this limited amount of research with non-Western younger populations has typically not investigated mechanisms operating between cultural variables and substance use.

Though there have been some reports about the moderating effects of cultural variables on the association between baseline and follow-up marijuana use by Colombian adolescents (Brook, et al., 2002) and the mediation by cognitive factors in the relationship between cultural orientation and alcohol use by Chinese adolescents (Qian, et al., 2008; Shell, et al., 2010), no prior research has studied mechanisms of moderation and mediation to account for the associations among culture, interpersonal factors, and alcohol use by college students in non-Western societies. The current study sought to address this gap by investigating alcohol use among undergraduate students in China, a population within which drinking and heavy drinking has become prevalent (Ji, et al., 2012). In terms of cultural changes, China provided a unique opportunity for this investigation. After decades of rapid

economic development, values within Chinese society have become notably more individualistic while the power of traditional values has been declining among younger generations (Stevenson & Zusho, 2002).

The first objective of this study was to examine the possible moderation effects of traditional and Western cultural orientations on the associations between peer influence and alcohol use. In view of the modest (Brook, Balka, et al., 1998; Brook & Pahl, 2005; Brook, Whiteman, et al., 1998) and sometimes non-significant (Iwamoto, et al., 2011; Thai, et al., 2010; Unger, et al., 2002) associations between cultural variables and alcohol use, as well as the mixed findings about the directions of cultural influences on alcohol use among minority adolescents and college students in Western societies (Hahm, et al., 2004; Hendershot, et al., 2008; Hendershot, et al., 2005), researchers have suggested a focus on the moderating mechanisms (Brook, et al., 2002; Castro & Alarcón, 2002; Organista, et al., 2003). For example, some research has investigated potential moderators of cultural variables such as gender, ethnicity group, religiosity, and parental attachment (Abdullah & Brown, 2012; Hahm, et al., 2003; Hendershot, et al., 2008; Kulis, et al., 2012; Zamboanga, Raffaelli, et al., 2006).

Consistent with the social ecological model (Bronfenbrenner, 1979), a better approach may be to conceptualize cultural variables as contextual effect modifiers of individual, interpersonal, and community level factors (Castro & Alarcón, 2002; Castro, et al., 2009). This approach has been applied to the development of theoretical frameworks for the interactive processes between culture and school, family, and peers contributing to health outcomes of American Latino adolescents (Castro, et al., 2009; Pantin, Schwartz, Sullivan, Prado, & Szapocznik, 2004). Also, some research has adopted this approach to study the

indirect effects of culture on substance use by American minority adolescents and college students (Brook, Balka, et al., 1998; Brook, Whiteman, et al., 1998; Luk, et al., 2013).

Based on this culturally sensitive contextual-effects-modifier approach, the current study focused on the possible interactive effects between cultural orientations and perceived peer norms on alcohol use. Peer influence is a potent interpersonal factor affecting college students' drinking behaviors (Borsari & Carey, 2001), and perceived peer norms is the type of peer influence reported to be the strongest psychosocial correlate of alcohol use among college students (Neighbors, et al., 2007; Perkins, 2007; Perkins, et al., 2005). Though there have been some reports of the interactions between cultural variables and peer use in relation to alcohol use (Gazis, et al., 2010) and cigarette smoking (Morgan-Lopez, et al., 2003) among minority adolescents in Western countries, no *a prior* hypotheses were specified in this study due to a lack of empirical evidence related to Chinese young adults.

The second objective of this study was to investigate perceived peer norms as potential mediators linking the associations between traditional and Western cultural orientations and alcohol use. Theories of adolescent substance use, such as primary socialization theory (Oetting, et al., 1998) and ecodevelopmental theory (Szapocznik & Coatsworth, 1999), propose that school, family, and peers are important processes through which culture affects substance use in minority adolescents. The mediating role of peer alcohol use in the associations between cultural variables and alcohol use by American minority adolescents has also been supported by research (Hahm, et al., 2004; Le, et al., 2009; Thai, et al., 2010). Additionally, peer use has been reported to mediate the effects of cultural variables on cigarette smoking (Unger, et al., 2000) and substance use (Prado, et al., 2009) by

American minority adolescents. Since peer influence is a potent interpersonal factor for alcohol use among college students (Borsari & Carey, 2001), we hypothesized that perceived peer norms would mediate the effects of cultural orientations on alcohol use by Chinese college students.

Methods

Participants and Procedure

Data were collected at Chengdu Medical College in the Sichuan province of China in 2012. The current study was approved by the Institutional Review Board of Emory University in the U.S. and the authority of Chengdu Medical College in China. Undergraduate students were recruited who were 18 or more years of age, and who had had at least one standard drink (i.e., 14 grams of pure alcohol) in the past six months. A total of 436 participants (218 males and 218 females) participated in this study. The mean age of this sample was 20.49 years (SD = 1.49). Most participants were of Han ethnicity (95.64%) and lived in the dormitories on campus (99.08%).

Every participant signed an informed consent form, took a self-administered paper-and-pencil survey, and was compensated with 20 Yuan (about three dollars) after completing the survey questionnaire. The questionnaire was written in Chinese; instruments developed for Western populations were translated into Chinese beforehand. The survey was conducted in groups of about 30 people in the classroom setting during the after-class time; confidentiality was ensured at all stages of the study. The average time to complete the survey was about 40 minutes.

Measures

Socio-demographic variables. Age, gender, and parents' income were assessed. Parents' income was evaluated by one six-point item; response options ranged from less than 1000 Yuan per month to more than 15000 Yuan per month.

Alcohol use. Alcohol use was assessed by the quantity-frequency method (Dawson, 2003). One seven-point item and one eight-point item were used to measure the overall frequency of beer, spirits, and wine consumption in the past 30 days and in the past six months, respectively. Response options of these two items ranged from 0 days to everyday. Two nine-point items were used to measure the usual quantity of beer, spirits, and wine participants consumed on days when they drank in the past 30 days and in the past six months. Response options of these two items ranged from zero to a maximum quantity to be provided. Quantity questions were phrased consistent with the measurement units used in China (i.e., 50 and 500 grams, and 500 milliliters). Consumption of beer, spirits, and wine was computed by multiplying the overall frequency and usual quantity of beer, spirits, and wine, respectively. Alcohol use was computed by summing consumption of the three alcoholic beverages in grams of pure alcohol. Following the convention for this computation (Cochrane, Chen, Conigrave, & Hao, 2003), the pure alcohol contents by volume of beer, spirits and wine were specified as 4%, 52% and 12%, respectively. The four-week test-retest stability coefficient for past six-month alcohol use in this study was .72 ($N = 126$, $p < .001$).

Heavy drinking. Two seven-point items were used to measure frequencies of heavy drinking in the past 30 days and in the past six months. Response options ranged from 0 days to 20 days or more in the past 30 days, or from 0 days to 100 days or more in the past six months. Heavy drinking was defined as consuming five or more drinks (male), or four or

more drinks (female), in about two hours (National Institute on Alcohol Abuse and Alcoholism, 2004, Winter). The quantity of five or four drinks was phrased consistent with the measurement units used in China. The four-week test-retest stability coefficient for past six-month heavy drinking in this study was .76 (N = 125, p < .001). Due to the low response rates for higher frequency responses for heavy drinking, this variable was dichotomized as either any or no heavy drinking in the past 30 days or in the past six months.

Alcohol-related problems. Twenty five-point items from the College Alcohol Study (Wechsler, et al., 1994) measuring alcohol-related problems in the past 12 months were used. Response options ranged from none to ten times or more. Due to the low response rates for higher frequencies of alcohol-related problems, each item was dichotomized as either having or not having a certain problem. Alcohol-related problems were computed by summing all problems reported, with a possible range of 0 to 20.

Cultural orientations. Five subscales of the Chinese Cultural Orientation Questionnaire (Xue, 2006) were used in the survey. The scale was developed for Chinese adolescents and has been applied in prior research with Chinese adolescents and college students (Qian, et al., 2008; Shell, et al., 2010; Tang, Cai, et al., 2013). It includes a total of 39 five-point Likert scale items. Response options of the items range from 1 (completely disagree) to 5 (completely agree). Chinese cultural orientation was to be assessed by two of the five subscales (collectivism and China pride); Western cultural orientation was to be assessed by three subscales (interest in the West, appearance preference, and consumerism).

To evaluate the psychometric properties of the instrument, a confirmatory factor analysis was conducted in Lisrel9.1 (Jöreskog & Sörbom, 2012). Each indicator was specified

to load on its corresponding factor only, and the five factors were allowed to covary. Robust maximum likelihood estimation was used for parameter estimation. Results showed that several indicators of the collectivism factor had insignificant or low factor loadings (below .30). Therefore, a model modification was conducted, and the 7-item collectivism subscale and three items of other subscales were deleted as a result. The final model included four factors with 29 indicators; fit indices of the model were acceptable (RMSEA = .05, CFI = .95, and SRMSR =.06) (Schreibera, Norab, Stagec, Barlowb, & Kinga, 2006; Worthington & Whittaker, 2006). Thus, Chinese cultural orientation was measured by the China pride subscale (8 items), and Western cultural orientation was measured by the three other subscales retained (21 items). Total scores of the two cultural orientations were used in data analyses, with a higher score indicating higher orientation toward a culture. Cronbach's alphas of the 8-item China pride, 7-item interests in the West, 7-item appearance preference, and 7-item consumerism were .80, .76, .74, and .61, respectively. Cronbach's alpha of Western cultural orientation was .81.

Perceived peer norms. Perceived alcohol use and heavy drinking of two referents (same-sex best friend and the same-sex average student on campus) were assessed using the same questions as those used for assessing individual past six-month alcohol use and past six-month heavy drinking, with the referents being modified accordingly. The four-week test-retest stability coefficients in this study for perceived alcohol use of same-sex best friend and perceived alcohol use of the same-sex average student on campus were .72 ($N = 125$, $p < 0.001$) and .71 ($N = 126$, $p < 0.001$), respectively. The four-week test-retest stability coefficients for perceived heavy drinking of same-sex best friend and perceived heavy

drinking of the same-sex average student on campus were .69 ($N = 124$, $p < 0.001$) and .52 ($N = 125$, $p < 0.001$), respectively. Due to the low response rates for higher frequency responses for perceived peer heavy drinking, this variable was dichotomized as peer engaging in either any or no heavy drinking in the past six months.

Data analyses

Three covariates (age, gender, and parents' income) were controlled in all statistical analyses. The three family income levels were categorized as low, medium, and high, corresponding to 2999 Yuan or less, 3000-5999 Yuan, and 6000 Yuan or more per month, respectively. The female and low family income groups were treated as reference groups in analyses. To account for skewness of the outcome variables, logarithmic transformations were applied to alcohol use and alcohol-related problems. Before taking the logarithms, constants of 10 and 2 were added to past-30 day alcohol use and alcohol-related problems, respectively, because there were some zero values for each of the two variables.

Logistic regression analyses were conducted for analyses related to heavy drinking. Covariates, cultural orientations, perceived peer heavy drinking, and interaction terms (cultural orientations × perceived peer heavy drinking) were entered as explanatory variables. Hierarchical regression analyses were conducted for analyses related to alcohol use and alcohol-related problems. For regression analyses of alcohol use, covariates were entered as the first step; cultural orientations and perceived peer alcohol use were entered as the second step; interaction terms (cultural orientations × perceived peer alcohol use) were entered as the last step. For the regression analysis of alcohol-related problems, usual alcohol use (past six-month alcohol use) was also entered as the first step along with the three covariates. For

all moderation analyses, cultural orientations and perceived peer alcohol use were mean-centered before computing the interaction terms to reduce multicollinearity (Aiken & West, 1991); only significant interactions were kept in the final models.

Mediators were tested using the macro developed by Preacher and Hayes (Preacher & Hayes, 2008). Because the macro cannot be applied to dichotomous mediators, only perceived peer alcohol use was tested as a potential mediator for the associations between cultural orientations and outcome variables (i.e., alcohol use and alcohol-related problems). Based on the recommended approach in research (Baron & Kenny, 1986; MacKinnon, Fairchild, & Fritz, 2007) if the independent variable was significantly associated with the mediator, and the mediator was significantly associated with the dependent variable after controlling for the independent variable, the mediation path would be examined. SPSS19.0 software package (IBM Corp., 2010) was used for all statistical analyses.

Missing data treatment

There were 8 and 17 participants who did not answer two or fewer items of the Chinese Cultural Orientation Questionnaire and alcohol-related problems items, respectively; these missing values were imputed as the medians of the relevant items. Subjects with missing values in perceived peer norms, alcohol use and heavy drinking were excluded from the relevant analyses. Less than 7% of subjects were excluded from any single regression analysis.

Results

The medians of past 30-day and past six-month alcohol use were 57.64 and 278.60

grams of pure alcohol, respectively, equivalent to about 4 and 20 drinks, respectively. There were 48.46% and 68.59% of participants who reported having ever engaged in heavy drinking in the past 30 days and in the past six months, respectively. The median number of alcohol-related problems was three. As Table1 shows, at the bivariate level, Chinese cultural orientation was not significantly correlated with any outcomes; Western cultural orientation was weakly correlated with past six-month alcohol use, past six-month heavy drinking, and alcohol-related problems. Perceived peer norms were moderately or weakly correlated with all outcomes.

Table2 and Table3 report the main and interaction effects of cultural orientations and perceived peer norms on outcome variables in the multivariable analyses. Chinese cultural orientation was not related to any outcomes; Western cultural orientation was positively related to past six-month alcohol use and alcohol-related problems. Perceived peer norms were significantly related to all outcomes except alcohol-related problems. Additionally, Western cultural orientation moderated the effects of perceived peer alcohol use on past six-month alcohol use.

To examine the significant moderator effects, simple slope analyses (Aiken & West, 1991) were conducted by holding Western cultural orientation constant at the high (mean + 1SD), medium (mean), and low (mean - 1SD) levels. Results of these post hoc analyses showed that perceived best friend alcohol use was related to past six-month alcohol use when Western cultural orientation was at the low (slope = 4.63×10^{-3}, $p < .001$), medium (slope = 3.74×10^{-3}, $p < .001$), and high (slope = 2.86×10^{-3}, $p < .001$) levels; perceived average student alcohol use was related to past six-month alcohol use when Western cultural

orientation was at the low (slope = 1.71×10^{-3}, $p < .01$), medium (slope = 2.99×10^{-3}, $p < .001$), and high (slope = 4.26×10^{-3}, $p < .001$) levels. Figure1 and Figure2 are visual displays of the two moderation effects. Finally, mediation analyses showed that perceived best friend alcohol use mediated the effects of Western cultural orientation on past 30-day and past six-month alcohol use (Table4).

Discussion

The current study investigated mechanisms for moderation and mediation in the associations among Chinese and Western cultural orientations, perceived peer norms, and alcohol use by undergraduate students in China. Culture was conceptualized as a contextual effect modifier of other lower-level factors (Castro & Alarcón, 2002; Castro, et al., 2009). The study showed that Western cultural orientation was a significant moderator of two types of perceived peer norms, i.e., best friend use and average student use. Furthermore, the two interaction effects were qualitatively different.

Western cultural orientation attenuated the harmful effect of perceived best friend use on individual alcohol use. For example, for perceived best friend use of more than 119 drinks (i.e., the crossing point of the two related lines in Figure1), the effect of perceived best friend use on past six-month alcohol use at the high level of Western cultural orientation was only 61.77% of that at the low level of Western cultural orientation. One possible explanation for this attenuating moderation effect is that Chinese college students with high Western cultural orientation scores tend to embrace individualism more (Wang, 2006); therefore, their drinking behaviors may be less affected by peers. This finding suggests that the values of

individualism and collectivism should be investigated as potential moderators of peer influence. In this regard, although scholars have proposed that collectivism may render minority adolescents in Western countries more susceptible to peer influence in relation to substance use (Unger, et al., 2002), and research with Australian indigenous adolescents has indicated that ethnic identity may be associated with increased peer influence in relation to alcohol use initiation (Gazis, et al., 2010), no prior research has investigated this moderation mechanism suggested by the current study. Furthermore, future investigation of this empirical question may benefit from using more refined measures. Because most extant research has used proxy measures (Hahm, et al., 2004; Thai, et al., 2010) or total scores of relevant scales (Luk, et al., 2013; Qian, et al., 2008; Shell, et al., 2010) to assess cultural variables, future research should develop scales to separately assess different domains of culture such as identification, behaviors and values (Beauvais, 1998; Thomson & Hoffman-Goetz, 2009; Unger & Schwartz, 2012).

In contrast to the findings regarding its moderating effect upon best friend use, Western cultural orientation enhanced the harmful effect of perceived average student use on individual alcohol use. The effect of perceived average student use on past six-month alcohol use at the high level of Western cultural orientation was 2.49 times higher than that at the low level of Western cultural orientation. To our knowledge, this is the first report of Western culture-related variables contributing to greater alcohol use among non-Western samples through moderating the effect of peer influence. Prior research with minority adolescents and college students in Western countries has reported the protective moderation effect of acculturation in relation to alcohol-related problems (Luk, et al., 2013), as well as the

protective (Brook, Balka, et al., 1998; Brook & Pahl, 2005; Brook, Whiteman, et al., 1998; Morgan-Lopez, et al., 2003) and harmful (Gazis, et al., 2010) moderation effects of traditional culture-related variables in relation to substance use. Thus, together with these previous reports, this finding suggests that the directions of the moderation effects of cultural variables on the associations between other factors and alcohol use may vary, depending on the specific phenomenon under investigation (e.g., the effect of peer influence on alcohol use) and its associated cultural contexts. An explanation for this synergistically harmful moderation effect of Western cultural orientation and perceived average student use is not readily available. However, this finding provides one possible explanation for the underlying processes of the global convergence of drinking patterns among younger populations (Jernigan, 2001; Room, et al., 2002), and suggests that Chinese college students who are highly oriented toward Western culture may be at increased risk for alcohol use due to the enhanced peer influence. Thus, it may be helpful to reduce risky drinking among these students by targeting perceived norms of the average student on campus via social norms interventions (Berkowitz, 2005; Perkins, 2003). Also, institutions located in large cities may be important intervention venues, as urban areas are affected more by Western culture than rural areas in non-Western societies (Arnett, 2002).

With respect to Chinese cultural orientation, neither its main effects nor its moderation effects on outcomes were significant. Though only China pride was used to represent Chinese cultural orientation in this study, prior research with Chinese adolescents that has used all related six subscales has also reported non-significant associations between Chinese cultural orientation and drinker types (Qian, et al., 2008; Shell, et al., 2010). The absence of a direct

association between Chinese cultural orientation and alcohol use may be due to the declining appeal of traditional cultural values to Chinese younger generations (Stevenson & Zusho, 2002), and certain pro-drinking norms in China, such as the widespread cultural myths like "friendship can be measured by how much you drink" (Tang, Cai, et al., 2013) and the acceptance of heavy drinking on social drinking occasions (Martinic & Measham, 2008). As for the possible moderations, previous research with adolescents in Columbia (Brook, et al., 2002), Australia (Gazis, et al., 2010) and the U.S. (Brook, Balka, et al., 1998; Brook & Pahl, 2005; Brook, Whiteman, et al., 1998; Morgan-Lopez, et al., 2003) has reported protective moderation effects of traditional culture-related variables in relation to alcohol and other substance use. Because only ethnic pride (i.e., China pride), a reflection of cultural identification (Castro, Sharp, Barrington, & Walton, 1991), was measured in this study, whether Chinese culture may moderate peer influence or not requires further investigation. Again, it may be beneficial to separately assess identification, behaviors and values associated with a culture (Schwartz, et al., 2010; Unger, 2012) in future research. Different domains of acculturation have been reported to have opposite effects on substance use by American minority adolescents (Schwartz, et al., 2013); it is possible that these domains of culture may have different moderation effects on peer influence.

Finally, consistent with previous reports on alcohol and other substance use among minority adolescents in Western countries (Hahm, et al., 2004; Le, et al., 2009; Prado, et al., 2009; Thai, et al., 2010), the results showed that perceived best friend use mediated the effect of Western cultural orientation on alcohol use by Chinese college students. This mediation effect was only found for perceived norms of best friend, possibly because the average

student on campus is an abstract peer referent with whom students have no social interactions. Additionally, the non-significant mediation effect of perceived peer norms in relation to alcohol-related problems may be caused by a methodological weakness of this study in that perceived peer norms for alcohol-related problems were not assessed. Supporting related theoretical propositions (Oetting, et al., 1998; Szapocznik & Coatsworth, 1999), this finding suggests that peers are the social processes by which Western culture affects alcohol use among Chinese college students. It is possible that through information and values sharing and behavioral modeling, peer interactions contribute to the orientation toward Western culture in Chinese college students. This finding, however, has little practical relevance, because the influence of Western culture on non-Western societies is likely to continue within the context of globalization. Additionally, because traditional culture-related variables such as ethnic identity and values have been proposed (Prado, et al., 2008; Schwartz, et al., 2006; Szapocznik, et al., 2007) and shown in research (Des Rosiers, et al., 2013; Gazis, et al., 2010; Schwartz, et al., 2013; Unger, et al., 2002) to be protective factors for alcohol and other substance use among minority younger populations in Western societies, it may be helpful to use more refined measures in future research to investigate if Chinese culture may protect against alcohol use and if peer influence may mediate this association to inform interventions.

These findings should be viewed within the context of the limitations of the current study. First, this study is a cross-sectional study, therefore, associations among the study variables cannot be considered as causal relationships. Second, data were collected from a single college through convenience sampling; as a result, generalization of the findings was limited. Third, Chinese cultural orientation was only represented by China pride, and a total

score was used to represent Western cultural orientation. Therefore, the roles that specific domains of the two cultures (e.g., identification, behaviors, and values) may play in the mechanisms investigated cannot be determined. Third, all alcohol-related outcomes were obtained through self-report, and no alternative assessments were used. Nonetheless, research has generally supported the reliability and validity of self-reported drinking behaviors (Del Boca & Noll, 2000; Miller et al., 2002). Fourth, the variance in indicators of alcohol use explained by the independent variables was small. Considering that participants' alcohol use was moderate, one possible reason is that light drinkers were overrepresented in this sample, and the homogeneity of the sample may have caused range restrictions. This, in turn, may have attenuated the strength of the associations among study variables. It is also possible that the behavioral assessments do not apply very well to these participants. Nevertheless, beverage-specific questions and the quantity-frequency method recommended for assessing alcohol use among infrequent drinkers (Dawson, 1998, 2003; Feunekes, van 't Veer, van Staveren, & Kok, 1999) were used to improve the validity of self-reported individual and peer alcohol use. Future research may benefit from using more representative samples to increase variability of the data. Fifth, only two interactions were detected, which may be due to the insufficient power caused by weak associations between predictors and outcomes (Frazier, Tix, & Barron, 2004; Whisman & McClelland, 2005). For example, the associations between perceived peer use and alcohol-related problems were non-significant. Therefore, replication research is necessary. Finally, although guided by related theories, this study was exploratory in nature. Because cultural changes in many non-Western countries may be the norm in the 21st century, it is necessary to develop a theoretical framework for understanding the

interactive processes that occur between Western culture and other lower-level factors affecting alcohol use among Chinese college students. This would allow testing of specific hypotheses in future research.

Despite these limitations, the current study takes an initial step in investigating the mechanisms producing the relationships among culture, peer influence, and alcohol use by Chinese college students. The findings highlight the significance of Western culture for alcohol use among Chinese college students through moderating and mediating mechanisms. Further research with refined instruments that may separately assess different domains of culture is needed to replicate the current findings and to investigate the empirical questions suggested by this study.

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Table1. *Zero-order correlations and descriptive information for study variables*

	1	2	3	4	5	6	7	8	9	10	11
1. Chinese cultural orientation		-.15**	.02	.01	.08	-.09	-.01	-.02	.00	.01	-.01
2. Western cultural orientation			.11*	.02	.13**	.14**	.07	.12*	.04	.13**	.21***
3. Perceived alcohol use of best friend (number of drinks)				.37***	.25***	.15**	.32***	.39***	.19***	.18**	.11*
4. Perceived alcohol use of average student (number of drinks)					.11*	.12*	.23***	.24***	.19***	.11*	.12*
5. Perceived heavy drinking of best friend						.39***	.24***	.27***	.31***	.38***	.33***
6. Perceived heavy drinking of average student							.24***	.29***	.29***	.41***	.26***
7. Past 30-day alcohol use								.70***	.55***	.38***	.32***
8. Past six-month alcohol use									.46***	.45***	.36***
9. Past 30-day heavy drinking										.64***	.23***
10. Past six-month heavy drinking											.27***
11. Alcohol-related problems											
Mean	4.01	2.83	69.03	40.54	.73	.78	4.26	5.63	.48	.69	1.60
SD	.49	.43	146.37	118.06	.45	.40	1.15	1.26	.50	.46	.47

Note. The mean average item scores of cultural orientations, and logarithmic forms of individual alcohol use and alcohol-related problems were reported. Point-biserial correlations and phi coefficient were computed for correlations between a dichotomous variable and a continuous variable, and two dichotomous variables, respectively.

*$p < .05$; **$p < .01$; ***$p < .001$.

Table2. *Main and interaction effects of cultural orientations and perceived peer norms on alcohol-related outcomes*

	Past 30-day alcohol use			Past six-month alcohol use			Alcohol-related problems		
	β	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2
Age	.19***			.01			.02		
Male	.31***			.38***			-.05		
Medium family income	.12*			.05			-.05		
High family income	.08			.09*			-.15**		
Past six-month alcohol use	N.A.	.20	.20***	N.A.	.22	.22***	.38***	.14	.14***
Perceived alcohol use of best friend	.16**			.30***			-.05		
Perceived alcohol use of average student	.07			.09			.06		
Chinese cultural orientation	.03			.04			.01		
Western cultural orientation	.08	.25	.05***	.13**	.31	.09***	.16***	.17	.03*
Western cultural orientation × perceived alcohol use of best friend	N.A.	N.A.	N.A.	-.15**			N.A.	N.A.	N.A.
Western cultural orientation × perceived alcohol use of average student	N.A.	N.A.	N.A.	.11*	.33	.02**	N.A.	N.A.	N.A.

Note. N.A. = not applicable.

*p < .05; **p < .01; ***p < .001.

Table3. *Associations between cultural orientations and perceived peer norms and heavy drinking*

	Past 30-day heavy drinking			Past six-month heavy drinking		
	B	*SE B*	OR (95% CI)	*B*	*SE B*	OR (95% CI)
Intercept	-3.95*	1.60	N.A.	-3.24	1.78	N.A.
Age	.08	.08	1.08 (.93, 1.25)	.08	.08	1.09 (.92, 1.28)
Male	.97***	.23	2.64 (1.69, 4.10)	.67**	.26	1.96 (1.18, 3.24)
Medium family income	.32	.24	1.38 (.86, 2.22)	.15	.27	1.16 (.69, 1.98)
High family income	.07	.32	1.07 (.57, 2.01)	.04*	.35	1.04 (.51, 2.12)
Perceived heavy drinking of best friend	1.05***	.28	2.85 (1.64, 4.95)	1.14***	.27	3.12 (1.83, .31)
Perceived heavy drinking of average student	1.07**	.32	2.90 (1.54, 5.48)	1.56***	.30	4.75 (2.63, 8.58)
Chinese cultural orientation	.01	.03	1.01 (.96, 1.07)	.02	.03	1.02 (.96, 1.08)
Western cultural orientation	.00	.01	1.01 (.98, 1.03)	.02	.01	1.02 (.99, 1.05)

Note. N.A. = not applicable.

*p < .05; **p < .01; ***p < .001.

Table4. *Perceived best friend alcohol use mediating the effects of Western cultural orientation on alcohol use*

Mediation paths	Total effect	Direct effect	Indirect effect	
	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	95% CI
Western cultural orientation → perceived alcohol use of best friend → past 30-day alcohol use	.0120 (.0056)*	.0089 (.0056)	.0030 (.0012)	.0009, .0060
Western cultural orientation → perceived alcohol use of best friend → past six-month alcohol use	.0218 (.0060)***	.0175 (.0058)**	.0042 (.0019)	.0009, .0084

Note. 95% CI of the indirect effect was 95% bias-corrected bootstrap confidence interval generated by 1000 bootstrap samples. Age, gender, and parents' monthly income level were controlled in all analyses.

*$p < .05$; **$p < .01$; ***$p < .001$.

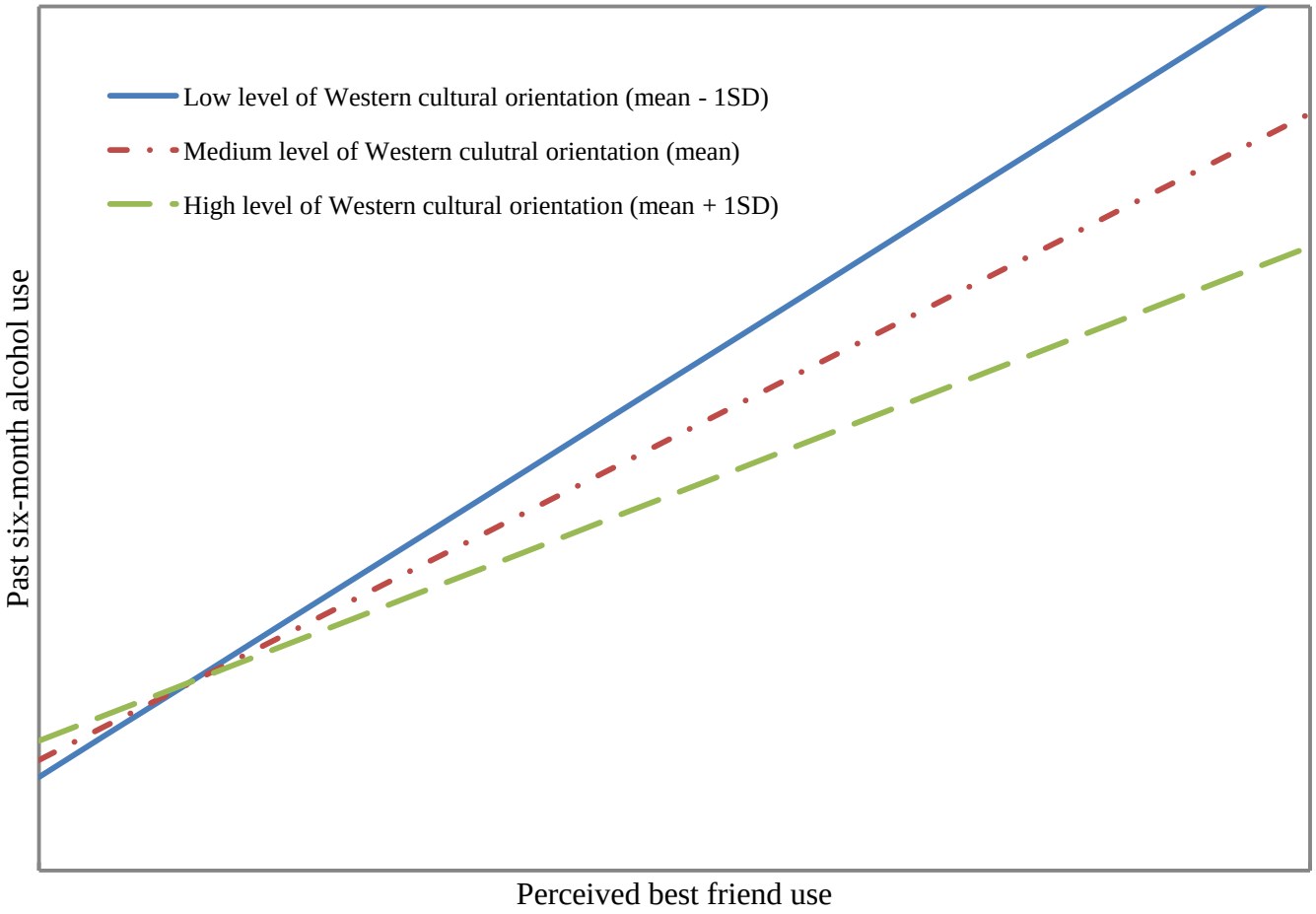

Figure1. Western cultural orientation moderated the effect of perceived best friend use on individual alcohol use

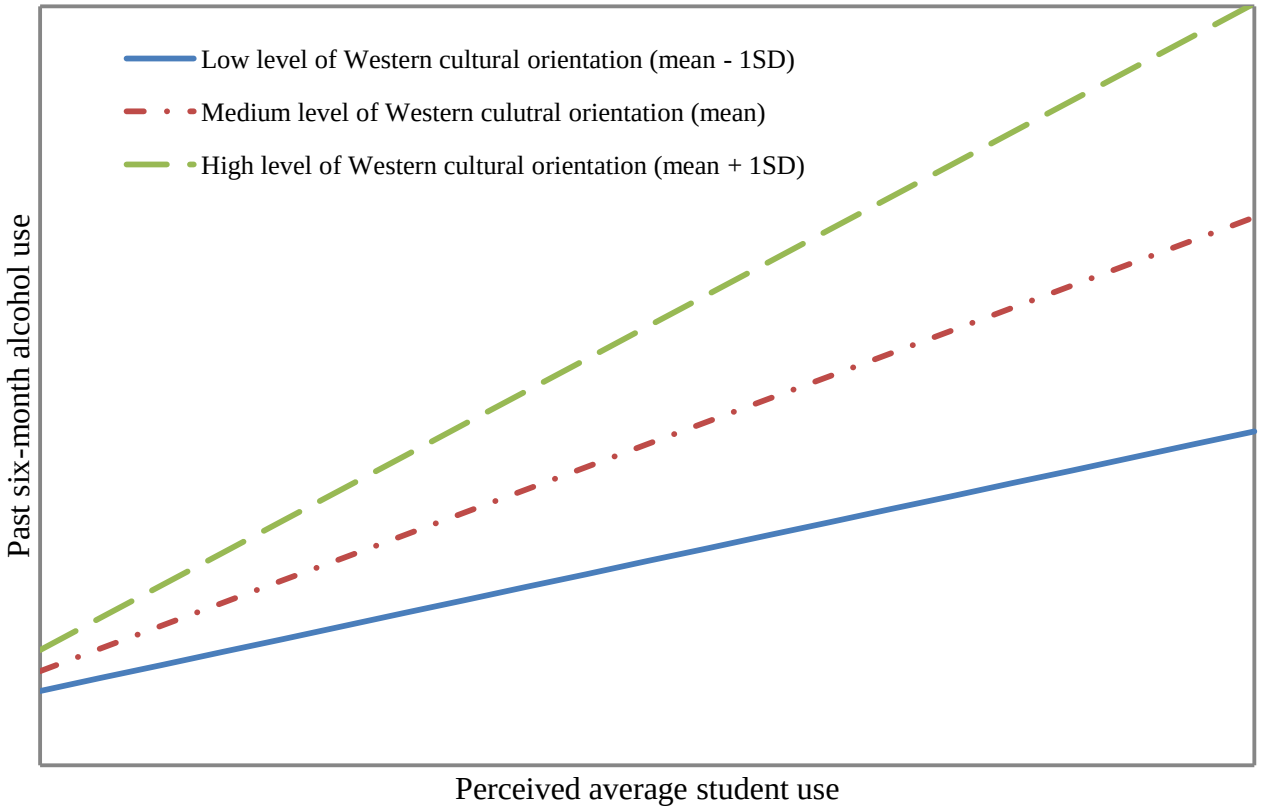

Figure2. Western cultural orientation moderated the effect of perceived average student use on individual alcohol use

STUDY 2. Perceived peer norms and alcohol use among Chinese undergraduate students: Implications for research and interventions for college drinking in China

Introduction

Alcohol use among college students has been associated with a range of negative consequences such as injuries, academic impairment, and sexual aggression (Perkins, 2002b; Wechsler, et al., 1994; Wechsler, et al., 1995). Moreover, for some individuals, alcohol use during the college years has been associated with alcohol abuse and dependence in the long term (Jennison, 2004; O'Neill, et al., 2001). Possibly due to the low drinking level in Chinese adults (World Health Organization, 2011b), college drinking has not received much attention in research in China yet. However, recent national epidemiological research conducted in China has shown that college drinking has become a significant health concern (Ji, et al., 2012). In 2009, 49.3% of Chinese college students surveyed reported having had at least one drink in the past 30 days, and 23.5% of these students reported having had five or more drinks on a single occasion in the past 30 days (Ji, et al., 2012). To address this gap, the current study investigated peer influence on alcohol use among Chinese undergraduate students.

Social learning theory (Bandura, 1977; Maisto, et al., 1999) proposes that peer influence is an important part of the social environment affecting people's behaviors. Research with college students in North America has also shown that peer influence was a potent risk factor for alcohol use (Baer, 2002; Borsari & Carey, 2001; Ham & Hope, 2003). We focused on perceived peer norms in this study, because they are one type of peer influence that have been most often studied in previous research (Borsari & Carey, 2001). Although no prior research has investigated perceived peer drinking norms

in Chinese college students, given the prevalent alcohol use in this population (Ji, et al., 2012) and the social nature of college life, the concept of peer norms should also be applicable to Chinese college students.

Research conducted in Western societies has consistently shown that the majority of college students overestimated peer norms (Fran ça, et al., 2010; Kypri & Langley, 2003; McAlaney & McMahon, 2007; Perkins, 2007; Perkins, et al., 2005; Perkins, et al., 1999). Perceived peer norms have been shown to be associated with college students' drinking (Baer, et al., 1991; Perkins, 2007; Perkins & Berkowitz, 1986), heavy drinking (Fran ça, et al., 2010; Perkins, et al., 2005; Yusko, et al., 2008), and alcohol-related problems (Clapp & McDonnell, 2000; Fearnow-Kenny, et al., 2001; Perkins & Wechsler, 1996). They have also been reported to have stronger effects on alcohol use among college students than the actual peer drinking norms (Perkins, 2007; Perkins, et al., 2005), and to be the strongest psychosocial correlates of college students' drinking behaviors (Cicognani & Zani, 2011; Kuther & Timoshin, 2003; Perkins, 2002a; Perkins, et al., 2005; Yanovitzky, et al., 2006). Moreover, social norms interventions have been successfully utilized to reduce college drinking in the U.S. (Berkowitz, 2004, 2005; Moreira, et al., 2009; Perkins, 2003). Thus, based on evidence gained largely from research conducted in North America, we investigated three empirical questions in this study.

First, we examined whether there was a perception that peer referents drank more than participants themselves, as has been reported in most prior research (Kypri & Langley, 2003; McAlaney & McMahon, 2007; Perkins, 2007; Perkins, et al., 2005). The answer to this question is fundamental for the potential application of the social norms approach in China in the future, as this intervening approach is predicated on correcting the elevated perceptions of peer norms among

college students to help to reduce alcohol use (Berkowitz, 2004, 2005; Perkins, 2003).

On top of that, we investigated the effects of perceived norms for two peer referents on alcohol use by using two assessment methods, i.e., a direct measure of perceived peer norms and the assessment of self-other-discrepancy (SOD) for alcohol use. SOD is a useful supplement for the direct assessment, because the direct measure may largely reflect individual alcohol consumption due to behavioral projection. Moreover, because the social norms approach assumes a positive discrepancy between perceived peer use and individual alcohol use, the investigation of SOD may also contribute to intervention research (Borsari & Carey, 2001, 2003). Based on research findings in American college students (Borsari & Carey, 2001, 2003; Carey, et al., 2006), it was hypothesized that perceived peer use would be positively associated with alcohol use, while SOD for alcohol use would be negatively associated. Perceived peer heavy drinking was hypothesized to be positively associated with heavy drinking, and with alcohol-related problems after controlling for usual alcohol use (past six-month alcohol use).

Second, we examined gender differences in perceived peer norms by testing the interaction effects between gender and perceived peer norms on alcohol-related outcomes. There has been some evidence suggesting such differences in college students. For example, some studies have shown that perceived peer norms had stronger effects on alcohol use in college men than in women (Larimer, et al., 2004; Read, et al., 2002), while others have found opposite results (Lewis & Neighbors, 2004).

Third, we investigated two potential cognitive mediators of perceived peer norms, i.e., alcohol expectancies and drinking refusal self-efficacy. Social learning theory (Bandura, 1977; Maisto, et al., 1999) suggests that cognitive processes (i.e., outcome expectancies and self-efficacy) are mechanisms through which social influences affect behaviors. Though the meditational roles of alcohol

expectancies in the associations between perceived peer norms and alcohol-related outcomes have been supported (Fearnow-Kenny, et al., 2001; Rimal, 2008; Scheier & Botvin, 1997; Webb, et al., 1993), drinking refusal self-efficacy (Lee & Oei, 1993; Young, et al., 1991) has not been tested as a mediator of perceived peer norms in prior research. Thus, in this study, both of these two cognitive factors were hypothesized to mediate the effects of perceived peer use and SOD for alcohol use on alcohol use, and the effects of perceived peer heavy drinking on heavy drinking, and alcohol-related problems after controlling for usual alcohol use.

Methods (Several parts of this section were omitted because they were the same with those in Study 1. Refer to the Methods part of Study 1 for details.)

Participants and Procedure.

Measures

Socio-demographic variables.

Alcohol use.

Heavy drinking.

Alcohol-related problems.

Perceived peer alcohol use. Perceived alcohol use of two peer referents (same-sex best friend and the same-sex average student on campus) was assessed by the same set of questions used for assessing individual past six-month alcohol use, with only the referent being modified accordingly. The four-week test-retest stability coefficients for perceived alcohol use of same-sex best friend and perceived alcohol use of the same-sex average student on campus in this study were .72 ($N = 125$, $p < 0.001$) and .71 ($N = 126$, $p < 0.001$), respectively. SOD for alcohol use was computed by subtracting

individual alcohol use from perceived peer alcohol use.

Perceived peer heavy drinking. Perceived heavy drinking of two peer referents was assessed using the same question as that used for assessing individual past six-month heavy drinking, with only the referent being modified accordingly. The four-week test-retest stability coefficients for perceived heavy drinking of same-sex best friend and perceived heavy drinking of the same-sex average student on campus in this study were .69 ($N = 124$, $p < 0.001$) and .52 ($N = 125$, $p < 0.001$), respectively. Due to the low response rates for higher frequency responses for perceived peer heavy drinking, this variable was dichotomized as peer engaging in either any or no heavy drinking in the past six months.

Alcohol expectancies. Fifty seven items of the alcohol expectancy scale developed for adult Chinese (Zhang, 2003) were administered. Response options of the items were binary (Yes or No). To assess psychometric properties of the instrument, multidimensional item response theory modeling (Chalmers, 2012) was used to explore the factor structure of the scale. Consistent with the scale development study (Zhang, 2003), two factors were identified and labeled as positive and negative alcohol expectancy, which included 37 and 12 items, respectively. Eight items were deleted through the analysis, due to low response rate (below 10%), low factor loadings (below .30), or cross-loadings and a discrepancy between the primary and secondary loadings below .20. An example positive alcohol expectancy item was, “drinking makes a person become more humorous”; an example negative alcohol expectancy item was, “people would behave stupidly after drinking alcohol”. Cronbach’s α of positive and negative alcohol expectancy were .88 and .75, respectively.

Drinking refusal self-efficacy. Thirty-seven six-point Likert scale items of the drinking refusal self-efficacy scale developed for adult Chinese (Zhang, 2003) were administered. Response options of the items ranged from 1 (not confident at all) to 6 (100% confident). An exploratory factor analysis

was conducted to explore the factor structure of this scale, followed by a confirmatory factor analysis to confirm the factor structure. Consistent with the scale development study (Zhang, 2003), two factors were identified and labeled as social and negative self-efficacy, which included 15 and 20 items, respectively. Two items were deleted via the exploratory factor analysis because of cross-loadings with a discrepancy of less than .20 between the primary and secondary loadings. Social self-efficacy referred to drinking-refusal self-efficacy under high risk situations involving particular social interactions, and negative self-efficacy referred to drinking-refusal self-efficacy under high risk situations involving negative emotional states (Skutle, 1999; Zhang, 2003). An example social self-efficacy item was, "when I am with friends and feel very happy and relaxed"; an example negative self-efficacy item was, "when I want to forget my worries". Cronbach's α of social and negative self-efficacy were .91 and .93, respectively.

Data analyses

Three covariates (age, gender, and parents' income) were controlled in all statistical analyses. The three family income levels were categorized as low, medium, and high, corresponding to 2999 Yuan or less, 3000-5999 Yuan, and 6000 Yuan or more per month, respectively. The female and low family income groups were treated as reference groups in analyses. To account for skewness of outcome variables, a logarithmic transformation was applied to alcohol use and alcohol-related problems. Before taking the logarithms, constants of 10 and 2 were added to past-30 day alcohol use and alcohol-related problems, respectively, because there were some zero values for each of the two variables.

Logistic regression analysis was used to test hypotheses related to heavy drinking. Covariates, perceived peer heavy drinking, and interaction terms (gender × perceived peer heavy drinking) were

entered as explanatory variables. Hierarchical regression analysis was used to test hypotheses related to alcohol use and alcohol-related problems. For regression analyses of alcohol use, covariates were entered as the first step; perceived peer alcohol use or SOD for alcohol use were entered as the second step; interaction terms (gender ×perceived peer alcohol use or SOD for alcohol use) were entered as the last step. For the regression analysis of alcohol-related problems, usual alcohol use (past six-month alcohol use) was entered as the first step along with the three covariates; perceived peer heavy drinking was entered as the second step; interaction terms (gender ×perceived peer heavy drinking) were entered as the last step. Because centered and raw data analyses generally yield equivalent results (Kromrey & Foster-Johnson, 1998), and centering only addresses nonessential multicollinearity (Shieh, 2010), while the possible multicollinearity between perceived peer norms and their interactions with gender was due to the actual relationship between the two, perceived peer norms were not centered in the analyses. Only significant interactions were kept in the final models.

Mediators were tested using the macro developed by Preacher and Hayes (Preacher & Hayes, 2008). Because the macro cannot be applied to dichotomous mediators, only perceived peer alcohol use was tested as a potential mediator for the associations between cultural orientations and outcome variables (i.e., alcohol use and alcohol-related problems). Based on the recommended approach in research (Baron & Kenny, 1986; MacKinnon, et al., 2007) if the independent variable was significantly associated with the mediator, and the mediator was significantly associated with the dependent variable after controlling for the independent variable, the mediation path would be examined. SPSS19.0 software package (IBM Corp., 2010) was used for all statistical analyses.

Missing data treatment

There were 25, 34 and 17 participants who did not answer 10% or less of the total items of

the alcohol expectancy scale, the drinking refusal self-efficacy scale, and alcohol-related problem items, respectively. These missing values were imputed as the medians of the relevant items. Subjects who did not answer 10% of the total items of the relevant scales, or had missing values in perceived peer norms and alcohol-related outcomes were excluded from related analyses. Less than 6% of subjects were excluded from any single regression analysis.

Results

Due to the highly skewed data, for descriptive statistics, medians and interquartile ranges were reported for alcohol use and alcohol-related problems; means and standard deviations were reported for heavy drinking. Also, non-parametric bivariate correlations were reported. As Table1 shows, alcohol consumption of participants was moderate, and alcohol-related problems were not a significant issue for this sample. Heavy drinking was common; 48.46% and 68.59% of participants reported engaging in heavy drinking in the past 30 days and in the past six months, respectively. A computation of SOD for alcohol use revealed that perceived alcohol use of the two peer referents was similar to, or lower than individual alcohol use. Additionally, 72.77% and 79.76% of participants reported that their same-sex best friend and the same-sex average student on campus engaged in heavy drinking in the past six months, respectively.

Most bivariate correlations between perceived peer norms and outcomes were significant, except that several correlations between SOD for alcohol use and outcomes were non-significant. As expected, the measures of perceived peer alcohol use were positively correlated with alcohol use, while SOD for alcohol use was negatively correlated. Additionally, SOD for alcohol use by the distal referent (the same-sex average student on campus) was more strongly correlated with alcohol use than

SOD for alcohol use by the proximal referent (same-sex best friend).

Tables 2-5 report the final models of the associations between perceived peer norms and outcomes. As hypothesized, perceived alcohol use of the two peer referents was positively associated with alcohol use, and SOD for alcohol use by the distal referent was negatively associated (Tables 2-3). Perceived heavy drinking of the two peer referents was positively associated with past 30-day and past six-month heavy drinking (Table4), and with alcohol-related problems after controlling for usual alcohol use (Table5). Additionally, before including the interaction terms into the models, only perceived best friend alcohol use and SOD for alcohol use by the distal referent were significantly associated with past 30-day and past six-month alcohol use.

Gender differences in perceived peer norms were observed. Perceived alcohol use of the distal referent and SOD for alcohol use by the distal referent had stronger effects on past 30-day and past six-month alcohol use in females than in males (Tables 2-3). Finally, positive alcohol expectancy partially mediated the effects of perceived peer norms on alcohol use and heavy drinking; social self-efficacy partially mediated the effects of perceived peer use on alcohol use, and negative self-efficacy partially mediated the effects of perceived peer heavy drinking on alcohol-related problems after controlling for usual alcohol use (Table6).

Discussion

To address the issue of college drinking in China, guided by social learning theory, the current study investigated the effects of perceived peer norms on alcohol use among Chinese undergraduate students. Gender differences in perceived peer norms were examined, and alcohol expectancy and drinking refusal self-efficacy were tested as mediators of the relationship between perceived peer

norms and alcohol-related outcomes.

In contrast with findings in college students in North America (Perkins, 2007; Perkins, et al., 1999), the results showed that participants did not perceive that their same-sex best friends and average students on campus drank more than themselves. The medians of SOD for alcohol use by the proximal and the distal referent were 0 and -2.56 drinks, respectively. Nevertheless, participants perceived that more peers drank heavily than they did. The proportions of same-sex best friends and average students on campus perceived as ever engaging in heavy drinking in the past six months (72.77% and 79.76%) were higher than the proportion of participants who engaged in heavy drinking in the past six months (68.59%).

Because the actual peer drinking norms were not assessed, the accuracy of these estimations cannot be determined, and we provided four possible explanations for these findings. First, considering that participants' alcohol consumption was moderate, and that drinking is encouraged to promote interpersonal relations in China (Martinic & Measham, 2008), it is possible that participants underestimated peer alcohol use. Participants may perceive alcohol use as a desirable behavior, and therefore were motivated to think that they drank more than their peers to maintain a positive self image. This is known as the false uniqueness effect, i.e., people holding positive attributes tend to perceive that they behave more differently from others than what is actually the case (Suls & Wan, 1987). Second, because drinking behaviors of close friends tend to be similar due to peer selection and socialization, participants may have generally accurately estimated best friend alcohol use. Also, because normative perceptions are based on observation, communication, and personal behavior (Miller & Prentice, 1996), people often have some factual information when estimating alcohol use of their best friends. For example, research of American college students has shown that the estimation

of alcohol use of proximal peers was more accurate than that of distal peers (Baer, et al., 1991; Larimer, et al., 2011). Thus, participants' estimation of best friend alcohol use may be generally unbiased. Third, given that only current drinkers were recruited, and alcohol use of this sample was characterized by moderate consumption and heavy drinking, it is possible that participants generally accurately estimated drinking norms of same-sex average students on campus. Fourth, because the actual norms were unknown, it is also possible that participants overestimated peer drinking norms, although the discrepancy between peer and personal alcohol use was negative for many participants.

The perception of drinking similarly to best friends and drinking more than distal peer referents has been found in American college students in the Greek system (Baer & Carney, 1993; Larimer, et al., 1997), but not in general American college samples. Thus, findings of this study indicate that there may be cultural differences in perceptions of peer drinking norms among college students. This possibility has also been suggested by a prior study of Australian college students which has found that participants may have not overestimated peer alcohol use (Halim, et al., 2012). Nonetheless, given that drinking rates varied greatly among individual institutions (Wechsler, Molnar, Davenport, & Baer, 1999), and that this sample was obtained from a single college through convenience sampling, further research with representative samples is needed.

Despite the unexpected findings of participants' perceptions of peer alcohol use, the patterns of the associations between perceived peer norms and alcohol-related outcomes are strikingly consistent with previous research. Consistent with findings in American college students (Borsari & Carey, 2001, 2003; Carey, et al., 2006), the results showed that perceptions of peers' drinking more alcohol and of peers' ever engaging in heavy drinking were associated with more alcohol use, a higher probability of engaging in heavy drinking, and more alcohol-related problems; a smaller perceived

discrepancy between peer and individual alcohol use was associated with more alcohol use. These patterns of associations suggested that, if future research finds exaggerated misperceptions of peer norms in Chinese college students as have been reported for American college students, it may be helpful to apply the social norms approach to reduce college drinking in China.

Additionally, findings of this study also supported the strength of assessing SOD in two aspects. First, the results suggested that SOD may help to explicate the true relationship between perceived peer norms and alcohol use. For example, while perceived best friend use was significantly associated with alcohol use, SOD for alcohol use by best friend was not, thus indicating that the former significant association may be caused by the overlap between individual and peer alcohol use. Similar findings have been reported for injunctive norms and SOD for injunctive norms in prior research (Perkins & Berkowitz, 1986). For another example, when using perceived peer alcohol use as a predictor of individual alcohol use, consistent with previous research (Kypri & Langley, 2003; LaBrie, et al., 2010; Thombs, et al., 2005; Yanovitzky, et al., 2006), perceived alcohol use of the proximal referent was found to be a stronger correlate than that of the distal referent in males. However, an opposite finding was indicated for females. Further analyses showed that only SOD for alcohol use by the distal referent was related to alcohol use, suggesting that the significant association between perceived best friend use and individual alcohol use may be an artifact caused by the direct measure of perceived peer norms. Second, the present findings suggest that a prior assessment of SOD may help to identify target students for social norms interventions. Specifically, the subgroup of light drinkers was found to have positive SOD (data not shown), suggesting that the norms-based interventions may only work for this subgroup. Similar finding have also been reported in previous research which has shown that only light and moderate drinkers had positive SOD (Carey, et al.,

2006). Taken together, these findings suggest that future research may benefit from using SOD as an additional assessment of the direct measure of perceived peer norms.

Finally, the findings revealed gender differences in perceived peer norms and supported the two hypothesized cognitive mediators of perceived peer norms. Consistent with prior research (Lewis & Neighbors, 2004), perceived alcohol use of the distal referent was shown to have stronger effects on alcohol use in females than in males, suggesting that more intensified social norms interventions may be needed for males in future interventions. Replicating previous findings (Fearnow-Kenny, et al., 2001; Scheier & Botvin, 1997; Webb, et al., 1993), positive alcohol expectancy was found to partially mediate the effects of perceived peer norms on alcohol use and heavy drinking. Furthermore, drinking refusal self-efficacy was shown to partially mediate the effects of perceived peer norms on alcohol use and alcohol-related problems. These results suggested that an incorporation of expectancy challenge (Jones, 2004) and life skills training for increasing refusal self-efficacy into social norms interventions may help to increase program effectiveness.

These findings should be viewed within the contexts of several limitations of this study. First, due to the cross-sectional research design, the direction of the associations between perceived peer norms and alcohol-related outcomes, as well as the direction of the two cognitive mechanisms through which these associations are mediated cannot be determined. Second, because this sample was not representative, the current findings cannot be generalized to the Chinese college population. Third, alcohol-related outcomes were obtained solely through self-report and may be biased due to social desirability and recall bias. Research has suggested, however, that self-reported data can provide reliable and valid assessments of drinking behaviors if critical issues such as confidentiality have been carefully addressed (Babor, Steinberg, Anton, & Del Boca, 2000; Del Boca & Darkes, 2003; Del

Boca & Noll, 2000; Miller, et al., 2002). Finally, the strong effects of perceived peer norms on alcohol-related outcomes, as has been reported in research among college students in Western societies, were not found. For example, perceived peer alcohol use or SOD for alcohol use explained only 4-9% of the variance in alcohol use and alcohol-related problems. The ORs of perceived peer heavy drinking for heavy drinking ranged from 2.88 to 4.83, suggesting moderate to strong effect sizes (Ferguson, 2009). Nonetheless, SOD for frequency of heavy drinking was not assessed and its effects on heavy drinking cannot be determined. One possible reason for this low degree of explanatory power may be due to range restrictions possibly associated with the homogeneity of alcohol use and related correlates in a sample obtained from a single college, and further research with more representative samples may help to address this issue.

Despite these limitations, the current study was the first to investigate the influences of perceived peer norms on alcohol use among Chinese college students. The present findings suggest that the overestimation of peer drinking norms in college students may not be universal, and that the social norms approach may be applicable to cultures other than the U.S. The study findings also suggest the strength of assessing self-other-discrepancy for alcohol use in research, and supported drinking refusal self-efficacy as another significant mediator of perceived peer norms in addition to alcohol expectancies. To address the unresolved issues of this study and inform interventions for college drinking in China, more empirical research is still needed.

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Table1. *Zero-order correlations and descriptive information for study variables*

	1	2	3	4	5	6	7	8	9	10	11
1. Past 30-day alcohol use		.70***	.40***	.27***	.32***	.45***	.45***	-.07	-.28***	.15**	.14**
2. Past six-month alcohol use			.32***	.25***	.37***	.55***	.52***	-.19***	-.47***	.12*	.14**
3. Past 30-day heavy drinking				.64***	.22***	.19***	.19***	.00	-.17***	.31***	.29***
4. Past six-month heavy drinking					.24***	.18***	.11*	.04	-.06	.38***	.41***
5. Alcohol-related problems						.37***	.31***	.10*	-.06	.30***	.25***
6. Perceived usual alcohol use of same-sex best friend							.52***	.59***	-.08	.25***	.15**
7. Perceived usual alcohol use of the same-sex average student on campus								.18***	.37***	.11*	.12*
8. SOD for alcohol use by same-sex best friend									.36***	.18***	.07
9. SOD for alcohol use by the same-sex average student on campus										.02	.02
10. Perceived heavy drinking of same-sex best friend											.39***
11. Perceived heavy drinking of the same-sex average student on campus											
Median/Mean	4.12	19.90	.48	.69	3.00	16.91	11.35	0	-2.56	.72	.80
Interquartile range/SD	9.10	40.23	.50	.46	3.00	58.62	33.37	37.25	23.57	.45	.40

Note. Alcohol use was reported in number of drinks. SOD = self-other discrepancy. Phi coefficient, point-biserial correlation coefficient, and Spearman's rank correlation coefficient were computed for correlations between two dichotomous variables, a dichotomous and a continuous variable, and two continuous variables, respectively.

*$p < .05$; **$p < .01$; ***$p < .001$.

Table2. *Hierarchical multiple regression analysis of the relationship between perceived peer use and individual alcohol use*

	Past 30-day alcohol use			Past six-month alcohol use		
	β	R^2	ΔR^2	*β*	R^2	ΔR^2
Age	.19***			.02		
Male	.34***			.43***		
Medium family income	.11*			.05		
High family income	.08	.21	.21***	.09*	.22	.22***
Perceived alcohol use of same-sex best friend	.18***			.26***		
Perceived alcohol use of the same-sex average student	.51**	.25	.04***	.79***	.29	.07***
Gender × perceived alcohol use of the same-sex average student on campus	-.46*	.26	.02*	-.75***	.32	.03***

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

Table3. *Hierarchical multiple regression analysis of the relationship between SOD for alcohol use and individual alcohol use*

	Past 30-day alcohol use			Past six-month alcohol use		
	β	R^2	ΔR^2	*β*	R^2	ΔR^2
Age	.23***			.06		
Male	.36***			.44***		
Medium family income	.14**			.09*		
High family income	.14**	.21	.21***	.18***	.23	.23***
SOD for alcohol use by same-sex best friend	.01			.02		
SOD for alcohol use by the same-sex average student	-.51***	.24	.03**	-.69***	.29	.06***
Gender × SOD for alcohol use by the same-sex average student	.35**	.25	.01**	.46***	.31	.02***

Note. SOD = self-other discrepancy.

*p < .05; **p < .01; ***p < .001.

Table4. *Logistic regression analysis of the relationship between perceived peer heavy drinking and individual heavy drinking*

	Past 30-day heavy drinking			Past six-month heavy drinking		
	B	*SE B*	OR (95% CI)	*B*	*SE B*	OR (95% CI)
Intercept	-3.90*	1.60	N.A.	-3.20	1.78	N.A.
Age	.07	.08	1.08 (.93, 1.25)	.08	.08	1.08 (.92, 1.27)
Male	.95***	.22	2.59 (1.68, 4.00)	.60*	.25	1.82 (1.11, 2.98)
Medium family income	.32	.24	1.38 (.86, 2.22)	.16	.27	1.17 (.69, 1.99)
High family income	.08	.32	1.08 (.58, 2.01)	.09	.36	1.09 (.54, 2.21)
Perceived heavy drinking of same-sex best friend	1.07***	.28	2.92 (1.69, 5.03)	1.21***	.27	3.35 (1.99, 5.65)
Perceived heavy drinking of the same-sex average student	1.06***	.32	2.88 (1.54, 5.41)	1.57***	.30	4.83 (2.71, 8.61)

Note. N.A.= not applicable.

*$p < .05$; **$p < .01$; ***$p < .001$.

Table5. *Hierarchical multiple regression analysis of the relationship between perceived peer heavy drinking and alcohol-related problems*

	Alcohol-related problems		
	β	R^2	ΔR^2
Age	.03		
Male	-.12*		
Medium family income	-.04		
High family income	-.13**		
Past six-month alcohol use	.33***	.14	.14***
Perceived heavy drinking of same-sex best friend	.23***		
Perceived heavy drinking of the same-sex average student	.12*	.22	.08***

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

Table6. *Alcohol expectancies and drinking refusal self-efficacy mediating the effects of perceived peer norms on alcohol-related outcomes*

Mediation paths to alcohol-related outcomes	Total effect	Direct effect	Indirect effect	
	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	95% CI
Paths to past 30-day alcohol use				
Perceived alcohol use of same-sex best friend → Positive AE and Social SE	.0016 (.0004)***	.0013 (.0003)***	Total: .0003 (.0001) Positive AE: .0002 (.0001) Social SE: .0001 (.0001)	Total[§]: .0001, .0005 Positive AE[§]: .0000, .0004 Social SE[§]: .0000, .0003
SOD for alcohol use by the same-sex average student → Positive AE	-.0015 (.0004)***	-.0012 (.0004)**	Positive AE: -.0003 (.0001)	Positive AE[§]: -.0006, -.0001
Paths to past six-month alcohol use				
Perceived alcohol use for same-sex best friend → Positive AE and Social SE	.0023 (.0004)***	.0019 (.0004)***	Total: .0004 (.0002) Positive AE: .0003(.0001) Social SE: .0001(.0001)	Total[§]: .0001, .0008 Positive AE[§]: .0001, .0006 Social SE[§]: .0000, .0003
SOD for alcohol use by the same-sex average student → Positive AE	-.0023 (.0004)***	-.0020 (.0004)***	Positive AE: -.0004(.0001)	Positive AE[§]: -.0007, -.0002
Paths to past 30-day heavy drinking				
Perceived heavy drinking of same-sex best friend → Positive AE and Negative SE	1.3213 (.2648)***	1.2024 (.2718)***	Total: .2054 (.0817) Positive AE: .1468 (.0702) Negative SE: .0587 (.0526)	Total[§]: .0715, .3912 Positive AE[§]: .0356, .3287 Negative SE: -.0229, .1867
Perceived heavy drinking of the same-sex average student → Positive AE and Negative SE	1.4101 (.3039)***	1.2721 (.3140)***	Total: .2259 (.0971) Positive AE: .1557 (.0754) Negative SE: .0702 (.0718)	Total[§]: .0450, .4192 Positive AE[§]: .0366, .3426 Negative SE: -.0571, .2318

Note. Positive AE, Social SE, and Negative SE refer to positive alcohol expectancy, social self-efficacy, and negative self-efficacy, respectively. 95% CI of the indirect effect was 95% bias-corrected bootstrap confidence interval generated by 1000 bootstrap samples. Age, gender, and parents' monthly income level were controlled in all analyses. [a]Past six-month alcohol use was also controlled. [§]Denotes a significant mediation.

*p < .05; **p < .01; ***p < .001.

Table6. *Alcohol expectancies and drinking refusal self-efficacy mediating the effects of perceived peer norms on alcohol-related outcomes (continued)*

Mediation paths to alcohol-related outcomes	Total effect	Direct effect	Indirect effect	
	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	95% CI
Paths to past six-month heavy drinking				
Perceived heavy drinking of same-sex best friend → Positive AE, Social SE, and Negative SE	1.5865 (.2479)***	1.4435 (.2550)***	Total: .2319 (.0912) Positive AE: .0860 (.0656) Social SE: .0940 (.0653) Negative SE: .0519 (.0618)	Total[§]: .0657, .4191 Positive AE: -.0193, .2464 Social SE: -.0031, .2656 Negative SE: -.0552, .1900
Perceived heavy drinking of the same-sex average student → Positive AE, Social SE, and Negative SE	1.9218 (.2797)***	1.8005 (.2906)***	Total: .2358 (.1101) Positive AE: .1137 (.0721) Social SE: .0956 (.0687) Negative SE: .0265 (.0848)	Total[§]: .0431, .4663 Positive AE[§]: .0054, .2906 Social SE: -.0025, .2835 Negative SE: -.1484, .2053
Paths to alcohol-related problems[a]				
Perceived heavy drinking of same-sex best friend → Positive AE, Social SE, and Negative SE	.2845 (.0488)***	.2494 (.0477)***	Total: .0346 (.0165) Positive AE: .0025 (.0062) Social SE: .0087 (.0080) Negative SE: .0238 (.0134)	Total[§]: .0070, .0716 Positive AE: -.0071, .0199 Social SE: -.0009, .0346 Negative SE[§]: .0028, .0576
Perceived heavy drinking of the same-sex average student → Positive AE, Social SE, and Negative SE	.2267 (.0554)***	.1708 (.0544)**	Total: .0556 (.0202) Positive AE: .0029 (.0057) Social SE: .0081 (.0073) Negative SE: .0446 (.0178)	Total[§]: .0233, .1013 Positive AE: -.0049, .0218 Social SE: -.0010, .0292 Negative SE[§]: .0158, .0914

Note. Positive AE, Social SE, and Negative SE refer to positive alcohol expectancy, social self-efficacy, and negative self-efficacy, respectively. 95% CI of the indirect effect was 95% bias-corrected bootstrap confidence interval generated by 1000 bootstrap samples. Age, gender, and parents' monthly income level were controlled in all analyses. [a]Past six-month alcohol use was also controlled. [§]Denotes a significant mediation.

*p < .05; **p < .01; ***p < .001.

STUDY 3. Alcohol expectancies, drinking refusal self-efficacy, drinking motives and alcohol use among Chinese college students

Introduction

Alcohol use and misuse among college students has become a global public health concern. Hazardous drinking among college students is prevalent in many developed countries (Gill, 2002; L. D. Johnston, O' Malley, Bachman, & Shulenberg, 2009; Kypri et al., 2009). Moreover, evidence has suggested that the pattern of heavy drinking among younger populations is spreading from the developed to the developing world (Jernigan, 2001; Room, et al., 2002). Although college drinking has been extensively studied in North America and a few other developed countries (Borsari, Murphy, & Barnett, 2007; Wechsler & Nelson, 2008; Wicki, et al., 2010), little is known about this phenomenon in most developing countries. The current study sought to fill this gap by investigating alcohol use among Chinese college students. China currently has about 23 million undergraduate students (Ministry of Education of the People's Republic of China, 2013); however, research on college drinking in this country is still scarce. Such research has become more necessary than ever before, given that alcohol use in adult Chinese has increased nearly six-fold from 1970 to 2005 (World Health Organization, 1999, 2011b), and alcohol use among Chinese college students has become prevalent (Ji, et al., 2012).

Because alcohol-related cognitions are potentially modifiable via interventions, we focused on three established cognitive factors affecting alcohol use among college students, i.e., alcohol expectancies, drinking refusal self-efficacy, and drinking motives (Baer, 2002; Evans & Dunn, 1995; Ham & Hope, 2003; Oei & Jardim, 2007; Young, et al., 2006). Alcohol expectancies are individuals'

specific beliefs about the behavioral, emotional, and cognitive effects of alcohol consumption (Baer, 2002). Alcohol expectancy theory proposes that alcohol expectancies are related to affect and motivations for drinking, and are parts of the common pathways to alcohol use through which the effects of antecedent variables on drinking are mediated (Goldman, 1994; Goldman, et al., 1991; Goldman, et al., 1999). Empirically, alcohol expectancies have been related to college students' drinking (Kuther & Timoshin, 2003; Stacy, et al., 1990) and alcohol-related problems (Evans & Dunn, 1995; Neighbors, et al., 2007). Alcohol expectancies have also predicted alcohol use among adolescents (Christiansen, et al., 1989) and college students (Sher, et al., 1996), and have mediated the effects of antecedents such as personality and peer influence on alcohol-related outcomes among adolescents (Scheier & Botvin, 1997; Urban, et al., 2008) and college students (Darkes, et al., 2004; Fearnow-Kenny, et al., 2001; Henderson, et al., 1994; Wood, et al., 2001).

Drinking refusal self-efficacy is the perceived ability to refuse drinking in specific high-risk situations (Lee & Oei, 1993). Based on the conceptualization of outcome expectancies and self-efficacy in social learning theory (Bandura, 1977; Maisto, et al., 1999), Oei and colleagues proposed a cognitive model of alcohol use, stating that both alcohol expectancies and drinking refusal self-efficacy are important determinants of alcohol use, and drinking refusal self-efficacy may serve as a moderator of alcohol expectancies (Oei & Baldwin, 1994; Oei & Morawska, 2004). Research with college students has reported that drinking refusal self-efficacy was related to alcohol use (Kuther & Timoshin, 2003; Oei & Jardim, 2007; Young, et al., 2006), risky drinking (Gullo, et al., 2010), and alcohol-related problems (Evans & Dunn, 1995), independent of the effects of alcohol expectancies. Drinking refusal self-efficacy has also been shown to mediate the effect of personality on alcohol use among college students (Gullo, et al., 2010), and moderate the effects of alcohol

expectancies on alcohol use among college students (Morawska & Oei, 2005; Oei & Jardim, 2007) and community adults (Hasking & Oei, 2002; Lee, et al., 1999).

Drinking motives are the needs or psychological functions that alcohol consumption fulfills (Baer, 2002). Whereas alcohol expectancies are beliefs about various effects of alcohol consumption, drinking motives are goal-directed, specific motivations for drinking (Cox & Klinger, 2004). The motivational model of alcohol use proposes that people are motivated to drink to gain affective changes, and motives for drinking are the final common pathways to alcohol use (Cox & Klinger, 1988, 2004). Research has shown that different types of drinking motives were associated with different antecedents and patterns of alcohol use in adolescents and adults (Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995). Compared with alcohol expectancies, drinking motives have been shown to explain more variance in alcohol-related outcomes of secondary school students (Kuntsche, et al., 2007) and college students (Cronin, 1997; Neighbors, et al., 2007), and have been reported to be stronger mediators of the relationship between religiosity and alcohol use (Galen & Rogers, 2004). Moreover, drinking motives have been shown to mediate the associations between antecedents such as personality and alcohol expectancies and alcohol-related outcomes in adolescents (Cooper, et al., 1995; Kuntsche, et al., 2007; Kuntsche, et al., 2010; Urban, et al., 2008) and college students (Littlefield, et al., 2010; Magid, et al., 2007; Read, et al., 2003).

Alcohol expectancies and drinking refusal self-efficacy have been reported to be related to drinker types among Chinese adolescents (Qian, et al., 2008; Shell, et al., 2009; Shell, et al., 2010). Built upon this empirical evidence, the current study investigated the associations among the three cognitive factors and alcohol use to determine the strength and specificity of relationships and to examine theoretical consistency of findings of this study with those reported for Western college

populations. Specifically, based on the related theories and prior research findings cited above, three hypotheses were tested in this study. First, we investigated the associations between alcohol expectancies, drinking refusal self-efficacy, and their interactions and alcohol use. It was hypothesized that positive alcohol expectancy would be positively associated with alcohol-related outcomes (i.e., alcohol use, heavy drinking, and alcohol-related problems), while negative alcohol expectancy and drinking refusal self-efficacy would be negatively associated. Additionally, drinking refusal self-efficacy was hypothesized to moderate the effects of positive and negative alcohol expectancies on alcohol-related outcomes.

Second, we investigated the associations between drinking motives and alcohol use. Based on research within Western younger populations (Cooper, 1994; Cooper, et al., 1995; Kuntsche, et al., 2005), and the drinking culture in China that heavy drinking is accepted or even encouraged on social drinking occasions (Martinic & Measham, 2008), it was hypothesized that controlling for alcohol expectancies and drinking refusal self-efficacy, the four drinking motives (social, enhancement, coping, and conformity) would be related to alcohol use; enhancement, coping, and social motives would be related to heavy drinking; and coping motives would be related to alcohol-related problems after controlling for usual alcohol use (i.e., past six-month alcohol use) as well.

Finally, we examined the meditational roles of drinking motives in the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol use. It was hypothesized that the four drinking motives would mediate the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol use; enhancement, coping and social motives would mediate the associations between alcohol expectancies and drinking refusal self-efficacy and heavy drinking; and coping motives would mediate the associations between alcohol expectancies and drinking refusal

self-efficacy and alcohol-related problems after controlling for usual alcohol use.

Methods (Several parts of this section were omitted because they were the same with those in Study 1 and Study 2. Refer to the Methods part of Study 1 and Study 2 for details.)

Participants and Procedure.

Measures

Socio-demographic variables.

Alcohol use.

Heavy drinking.

Alcohol-related problems.

Alcohol expectancies.

Drinking refusal self-efficacy.

Drinking motives. Twenty five-point items of the Drinking Motives Questionnaire-Revised (Cooper, 1994) were administered. Response options ranged from 1 (almost never/never) to 5 (almost always/always). An exploratory factor analysis was conducted to explore the factor structure of this scale, and two items were deleted due to low factor loadings (below .32). Consistent with the scale development study (Cooper, 1994), the four factors were labeled as social, enhancement, coping, and conformity motives, which included six, five, four, and three items, respectively.

Data analyses

The effects of three covariates (age, gender, and parents' monthly income) were controlled in all statistical analyses. Three family income levels were categorized as low, medium, and high, corresponding to 2999 Yuan or less, 3000-5999 Yuan, and 6000 Yuan or more per month, respectively. The female and low family income groups were treated as reference groups in analyses. To account

for skewness of the outcome variables, logarithmic transformations were applied to alcohol use and alcohol-related problems. Before taking the logarithms, constants of 10 and 2 were added to past-30 day alcohol use and alcohol-related problems, respectively, because there were some zero values for each of the two variables.

Logistic regression was used to test hypotheses related to heavy drinking. Covariates, independent variables and their interactions (positive alcohol expectancy × social self-efficacy, negative alcohol expectancy × social self-efficacy, positive alcohol expectancy × negative self-efficacy, and negative alcohol expectancy × negative self-efficacy) were included as explanatory variables into the models. Hierarchical regression analysis was used to test hypotheses related to alcohol use and alcohol-related problems. The covariates were entered as the first step. Alcohol expectancies, drinking refusal self-efficacy, and their interactions were entered as the second step. Drinking motives were entered as the last step. To reduce multicollinearity, independent variables were mean-centered before computing the interaction terms (Aiken & West, 1991). Only significant interactions were kept in the final models.

Mediators were tested using the macro developed by Preacher and Hayes (Preacher & Hayes, 2008). Because the macro cannot be applied to dichotomous mediators, only perceived peer alcohol use was tested as a potential mediator for the associations between cultural orientations and outcome variables (i.e., alcohol use and alcohol-related problems). Based on the recommended approach in research (Baron & Kenny, 1986; MacKinnon, et al., 2007) if the independent variable was significantly associated with the mediator, and the mediator was significantly associated with the dependent variable after controlling for the independent variable, the mediation path would be examined. SPSS19.0 software package (IBM Corp., 2010) was used for all statistical analyses.

Missing data treatment

One subject did not answer more than 10% of the total items of the alcohol expectancy scale and was excluded from all analyses. There were 25, 34, 11, and 17 subjects who did not answer 10% or less of the total items of the alcohol expectancy scale, the drinking refusal self-efficacy scale, the Drinking Motives Questionnaire-Revised, and alcohol-related problem items, respectively. These missing values were imputed as the medians of the relevant items. Subjects with missing values in alcohol use and heavy drinking were excluded from the relevant analyses. Less than 7% of subjects were excluded from any single regression analysis.

Results

The medians of past 30-day and past six-month alcohol use were 57.41 and 278.29 grams of pure alcohol, respectively, equivalent to about 4 and 20 drinks, respectively. There were 48.33% and 68.51% of participants who reported having ever engaged in heavy drinking in the past 30 days and in the past six months, respectively. The median number of alcohol-related problems was three.

Table1 reports the descriptive statistics. Cronbach's alphas of all subscales were above .70, indicating acceptable internal consistency (Nunnally & Bernstein, 1994). Positive alcohol expectancy was weakly or moderately correlated with all outcomes. Negative alcohol expectancy was weakly correlated with past six-month alcohol use only. The correlations between social and negative self-efficacy and outcomes; and between social, enhancement, and coping motives and outcomes were generally weak. Conformity motives were weakly correlated with alcohol-related problems only.

Table2 and Table3 report the final models of the relationship between the three cognitive factors and outcome variables, and we can see that the first hypothesis was partially supported. As

expected, positive alcohol expectancy was positively associated with past 30-day and past six-month alcohol use, and past 30-day heavy drinking. Negative alcohol expectancy, however, was not significantly related to any outcomes. Additional analyses showed that, controlling for covariates only, negative alcohol expectancy was negatively related to past six-month alcohol use, but this association became non-significant once positive alcohol expectancy was included into the model. Social self-efficacy was negatively associated with past six-month alcohol use, past six-month heavy drinking, and alcohol-related problems; negative self-efficacy was negatively associated with alcohol-related problems only. The magnitude of these associations between alcohol expectancies and drinking refusal self-efficacy and outcomes changed little when drinking motives were also included into the regression models as the last step. Finally, the interactions of alcohol expectancies and drinking refusal self-efficacy were insignificant. Additional analyses showed that estimations of the effect size (f^2) (Aiken & West, 1991) of the hypothesized moderation effects on alcohol use and alcohol-related problems were lower than .02, the small effect size defined by Cohen (Cohen, 1988).

The second hypothesis was also partially supported. Drinking motives accounted for significant variance in past six-month alcohol use and in alcohol-related problems, over and above the effects of alcohol expectancies and drinking refusal self-efficacy. Specifically, enhancement motives were positively related to past 30-day and past six-month alcohol use; conformity motives were negatively related to past six-month alcohol use; coping motives were positively related to alcohol-related problems. Social motives were not associated with any outcomes. Contrary to the hypothesis, drinking motives were not associated with heavy drinking.

The third hypothesis was generally supported. As Table4 shows, of the 27 mediations examined, 18 were significant. The directions of these mediated effects were consistent with the

hypothesized mediation processes. The most robust mediational effects were for enhancement motives linking the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol use, and coping motives linking the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol-related problems.

Discussion

To address the emerging issue of college drinking in China, the current study investigated the associations among alcohol expectancies, drinking refusal self-efficacy, drinking motives and alcohol-related outcomes with a Chinese undergraduate student sample. The relative significance of the three cognitive factors for alcohol use was examined, and drinking motives were tested as mediators of the relationship between alcohol expectancies and drinking refusal self-efficacy and alcohol use.

The present findings supported the utility of alcohol expectancy theory (Goldman, et al., 1999) for studying college drinking in China. When all the three cognitive factors were taken into account, positive alcohol expectancy was shown to be the strongest correlate of past 30-day and past six-month alcohol use and past 30-day heavy drinking. Compared with positive alcohol expectancy, negative alcohol expectancy was less influential; its negative effect on past six-month alcohol use disappeared once positive alcohol expectancy was also included into the regression model. This is consistent with the majority of research conducted in Western countries which has reported that positive alcohol expectancy outperformed negative alcohol expectancy in the explanation of alcohol use among adolescents and college students (Stacy, et al., 1990; Urban, et al., 2008; Young, et al., 2006). The relative significance of these two alcohol expectancies for alcohol use may be due to the fact that

positive alcohol expectancy reflects the belief of immediate consequences of drinking more salient than the belief of delayed outcomes, and positive alcohol expectancy may be more readily accessible from memory than negative alcohol expectancy (Jones, et al., 2001). Additionally, behavioral characteristics of this sample may have also contributed to this finding. Consistent with national epidemiological research which has shown that the prevalence of drinking and heavy drinking among Chinese young adults was lower than that of the middle age group (Hao et al., 2004; Li et al., 2011), we found that alcohol consumption of participants was moderate. From the perspective of social learning theory (Bandura, 1977; Maisto, et al., 1999), due to limited drinking experiences, Chinese college students may have encountered more positive effects of drinking than negative ones; therefore, positive alcohol expectancy may be a more salient factor for alcohol use among these students than negative alcohol expectancy.

Supporting the cognitive model of alcohol use proposed by Oei and colleagues (Oei & Baldwin, 1994; Oei & Morawska, 2004), drinking refusal self-efficacy was shown to be related to all three types of alcohol-related outcomes. Consistent with previous research conducted in Western countries (Evans & Dunn, 1995; Hasking & Oei, 2002; Young, et al., 2006), the results showed that both positive alcohol expectancy and social self-efficacy were related to past six-month alcohol use. Social self-efficacy was also the only significant correlate of past six-month heavy drinking. Moreover, after controlling for usual alcohol use and coping motives, both social and negative self-efficacy were significantly related to alcohol-related problems, while alcohol expectancies were not, suggesting that drinking refusal self-efficacy may be a more significant factor for alcohol-related long-term consequences than alcohol expectancies in Chinese college students.

The hypothesized moderation effects of drinking refusal self-efficacy on the associations

between alcohol expectancies and alcohol use were not detected, however. This may have been caused by the low statistical power in moderation analyses (Carte & Russell, 2003; Russell & Dean, 2000), or the smaller observed effect size relative to the population effect size (Aguinis, Beaty, Boik, & Pierce, 2005). Alternatively, as one previous study with Australian and Chinese college students (Oei & Jardim, 2007) has indicated, possibly due to cultural differences, the moderation effects of drinking refusal self-efficacy may not be applicable to Chinese college students. Therefore, replication research with sufficient sample size is needed.

The current findings provided some support for the motivational model of alcohol use (Cox & Klinger, 1988, 2004). Drinking motives accounted for significant variance in past six-month alcohol use and in alcohol-related problems, above and beyond the contributions of alcohol expectancies and drinking refusal self-efficacy. Consistent with research among adolescents and college students in Western countries (Cooper, 1994; Kuntsche, et al., 2005), enhancement and coping motives were shown to be particularly important correlates of alcohol use and alcohol-related problems, respectively; conformity motives were negatively related to past six-month alcohol use. Furthermore, the majority of the mediationl effects tested were significant. Of particular note, the results revealed a mediation process rarely investigated in previous research, i.e., drinking motives mediating the relationship between drinking refusal self-efficacy and alcohol-related outcomes. Consistent with evidence in adolescents and college students in Western societies (Kuntsche, et al., 2005), the most reliable mediators were enhancement motives linking positive and negative alcohol expectancies and drinking refusal self-efficacy and alcohol use, and coping motives linking positive alcohol expectancy and drinking refusal self-efficacy and alcohol-related problems.

The proposition that drinking motives are the final common pathways to alcohol use (Cox &

Klinger, 1988, 2004) was not supported. For example, consistent with most prior research with Western populations (Kuntsche, et al., 2010; Read, et al., 2003), drinking motives did not fully mediate the effects of alcohol expectancies and drinking refusal self-efficacy on alcohol-related outcomes. For another example, contrary to findings in adolescents and college students in Western countries (Cronin, 1997; Kuntsche, et al., 2007; Kuntsche, et al., 2010), drinking motives did not account for more variance in alcohol use than alcohol expectancies and drinking refusal self-efficacy did, and positive alcohol expectancy was found to be a stronger correlate of alcohol use than drinking motives. Nevertheless, similar findings have been reported in prior research, i.e., that drinking motives explained little additional variance in alcohol-related outcomes independent of alcohol expectancies and drinking refusal self-efficacy (Engels, et al., 2005). Taken together, these results suggest that drinking motives may be components of major common pathways to alcohol use that can serve as mediators of alcohol expectancies and drinking refusal self-efficacy, while the more distal factors of alcohol expectancies and drinking refusal self-efficacy may still have independent direct influences on alcohol use. The relative significance of these three cognitive factors for alcohol-related outcomes in Chinese college students awaits future empirical evidence.

Perhaps the most significant finding of this study is the specificity of the associations among the study variables. The patterns of these associations are generally consistent with those found in Western college populations, with the exception that social motives were significant mediators in relation to heavy drinking, which may be due to the fact that social drinking often involves heavy drinking in China (Martinic & Measham, 2008). Nonetheless, the strength of these associations was not as strong as has been reported in prior research (Evans & Dunn, 1995; Kuntsche, et al., 2010; Young, et al., 2006). For example, the three cognitive factors explained only .06-.13 of the variance in

alcohol use and in alcohol-related problems, suggesting a minimum effect size that may have practical significance (Ferguson, 2009). Three possible reasons may have contributed to this low degree of explanation. First, the convenience sampling method used in this study may have restricted the variability of the measured factors; consequently, the magnitude of the associations between cognitive factors and alcohol-related outcomes may have been attenuated. Second, the alcohol expectancy scale and the drinking refusal self-efficacy scale may have limited construct validity, because the scale development study only examined the correlations between these two constructs and alcohol use to assess construct validity (Zhang, 2003). Third, one previous study that also found weak associations between the three cognitive factors and alcohol use has suggested that the influences of these cognitive factors on alcohol use may not be strong in people with stable drinking levels (Engels, et al., 2005). In this study, we found that participants of different class years did not differ significantly in usual alcohol use; thus, the stable drinking level of this sample may also be part of the reason. Nevertheless, small effect sizes are commonly found in social sciences research, and do not detract from the theoretical implications of the findings (Cohen, 1988). The consistent patterns of the associations among the three cognitive factors and alcohol-related outcomes, therefore, provide strong support for the utility of the related theories to Chinese college students.

The present findings should be viewed within the context of several limitations of this study. First, data were collected from a single college, limiting generalizability of the findings. Second, because of the cross-sectional research design, causal inferences about the associations among the study variables cannot be made. Third, self-reported data may not accurately reflect actual behaviors, and may cause an overestimation of significant results caused by the shared method variance and criterion contamination (e.g. the alcohol expectancy scale assesses accumulated experiences with

drinking). Despite these limitations, the current study provided three implications for future research on college drinking in China. First, more research is needed to replicate the present findings and to address several unresolved issues of this study, including the insignificant hypothesized moderation effects, the low explanatory power of the cognitive factors for alcohol use, and the few significant predictors of heavy drinking. Future research may benefit from using more representative samples and recruiting more drinkers engaging in frequent heavy drinking to increase variability of the data. Also, it may be helpful to incorporate a pilot study to estimate the effect size of the hypothesized moderations and conduct power analyses prior to research (Carte & Russell, 2003). Second, as evidenced by the potent effects of coping motives on alcohol-related problems and the meditational roles of coping motives in relation to alcohol-related problems, the current study suggests that coping warrants further investigation. The coping model of alcohol use has been emphasized by social learning theory (Bandura, 1977; Maisto, et al., 1999); empirical research on college student and community samples has also supported the influence of coping strategies on alcohol drinking (Evans & Dunn, 1995; Hasking & Oei, 2002). Thus, it may be beneficial for future research to include stress and coping as additional explanatory variables. Finally, the consistent patterns of the associations among the cognitive factors and alcohol-related outcomes found in this study, albeit of low magnitude, support the potential of intervening with the three cognitive factors to prevent harmful drinking patterns among Chinese college students in future research.

To conclude, the current study was among the first few investigations to examine the associations among alcohol expectancies, drinking refusal self-efficacy, and drinking motives and alcohol use by college students in China. The study findings are largely consistent with research of college students in Western societies, suggesting that theories and interventions developed for

populations in Western societies are applicable to Chinese college students. To address the empirical questions suggested by this study, further research is needed.

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Table1. *Zero-order correlations and descriptive information for study variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Positive alcohol expectancy		-.09	-.44***	-.46***	.41***	.53***	.47***	.30***	.32***	.35***	.26***	.24***	.26***
2. Negative alcohol expectancy			.01	-.02	.03	-.16**	.01	.07	-.09	-.17***	-.07	-.08	.04
3. Social self-efficacy				.34***	-.55***	-.31***	-.18***	-.27***	-.23***	-.28***	-.13**	-.22***	-.25***
4. Negative self-efficacy					-.21***	-.33***	-.49***	-.23***	-.17***	-.17***	-.18***	-.18***	-.32***
5. Social motives						.33***	.21***	.42***	.19***	.23***	.17***	.17***	.22***
6. Enhancement motives							.42***	31***	.27***	.29***	.20***	.16***	.17***
7. Coping motives								.33***	.16***	.19***	.16***	.18***	.34***
8. Conformity motives									.08	.09	.06	.07	.23***
9. Past 30-day alcohol use										.70***	.55***	.37***	.32***
10. Past six-month alcohol use											.46***	.45***	.36***
11. Past 30-day heavy drinking												.64***	.23***
12. Past six-month heavy drinking													.28***
13. Alcohol-related problems													
Mean	20.35	7.34	36.41	89.31	19.70	8.71	7.88	4.84	4.26	5.63	.49	.69	1.60
SD	7.52	2.96	14.50	19.94	4.76	3.67	3.31	2.35	1.15	1.26	.50	.46	.47
Cronbach's alpha	.88	.75	.91	.93	.82	.81	.84	.78	N.A.	N.A.	N.A.	N.A.	N.A.

Note. The logarithmic forms of alcohol use and alcohol-related problems were used. Point-biserial correlations and phi coefficients were used for correlations between a dichotomous variable and a continuous variable, and two dichotomous variables, respectively. N.A. = not applicable.

*p < .05; **p < .01; ***p < .001.

Table2. *Hierarchical multiple regression analysis of the associations between alcohol expectancies, drinking refusal self-efficacy, and drinking motives and alcohol-related outcomes*

	Past 30-day alcohol use			Past six-month alcohol use			Alcohol-related problems		
	β	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2
Age	.14**			-.03			-.03		
Male	.35***			.42***			-.03		
Medium family income	.10*			.05			-.05		
High family income	.10*	.20	.20***	.13**	.22	.22***	-.11*		
Past six-month alcohol use	N.A.			N.A.			.32***	.14	.14***
Positive alcohol expectancy	.15*			.18**			-.05		
Negative alcohol expectancy	.01			-.05			.07		
Social self-efficacy	-.08			-.13*			-.10*		
Negative self-efficacy	-.00	.26	.06***	.02	.33	.11***	-.15**	.22	.07***
Social motives	.03			.04			N.A.		
Enhancement motives	.11*			.11*			N.A.		
Conformity motives	-.08			-.10*			N.A.		
Coping motives	.02	.27	.01	.07	.35	.02*	.22***	.25	.03***

Note. N.A.= not applicable.

*p < .05; **p < .01; ***p < .001.

Table3. *Logistic regression analysis of the associations between alcohol expectancies, drinking refusal self-efficacy, and drinking motives and heavy drinking*

	Past 30-day heavy drinking			Past six-month heavy drinking		
	B	*SE B*	OR (95% CI)	*B*	*SE B*	OR (95% CI)
Intercept	-2.38	1.89	N.A.	1.28	2.00	N.A.
Age	.01	.08	1.01 (.87, 1.17)	-.03	.08	.97 (.83, 1.14)
Male	1.20***	.22	3.32 (2.17, 5.08)	.97***	.24	2.63 (1.66, 4.18)
Medium family income	.04	.24	1.04 (.65, 1.66)	-.16	.26	.86 (.52, 1.41)
High family income	.02	.32	1.02 (.55, 1.89)	.01	.34	1.01 (.52, 1.96)
Positive alcohol expectancy	.04*	.02	1.04 (1.00, 1.08)	.03	.02	1.03 (.98, 1.07)
Negative alcohol expectancy	.00	.04	1.00 (.93, 1.08)	-.03	.04	.97 (.89, 1.05)
Social self-efficacy	.01	.01	1.01 (.99, 1.03)	-.02*	.01	.98 (.96, 1.00)
Negative self-efficacy	-.01	.01	.99 (.98, 1.01)	-.01	.01	1.00 (.98, 1.01)
Social motives	.03	.03	1.04 (.98, 1.09)	.00	.03	1.00 (.95, 1.06)
Enhancement motives	.04	.04	1.04 (.97, 1.12)	-.00	.04	1.00 (.93, 1.09)
Coping motives	.03	.04	1.03 (.95, 1.11)	.07	.05	1.08 (.98, 1.18)

Note. N.A.= not applicable.

*p < .05; **p < .01; ***p < .001.

Table4. *Drinking motives mediating the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol-related outcomes*

Mediation paths to alcohol outcomes	Total effect	Direct effect	Indirect effect	
	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	95% CI
Paths to past 30-day alcohol use				
Positive AE → enhancement motives	.036 (.007)***	.028 (.008)***	enhancement: .009 (.004)	enhancement[§]: .001, .017
Negative AE → enhancement motives	-.011 (.017)	.002 (.017)	enhancement: -.013 (.005)	enhancement[§]: -.025, -.005
Social SE → coping and enhancement motives	-.013 (.003)***	-.009 (.004)**	Total: -.004 (.001)	Total[§]: -.007, -.002
			coping: -.001 (.001)	coping: -.002, .001
			enhancement: -.003 (.001)	enhancement[§]: -.006, -.001
Negative SE → social and enhancement motives	-.007 (.003)**	-.004 (.003)	Total: -.004 (.001)	Total[§]: -.006, -.002
			social: -.001 (.001)	social: -.002, .000
			enhancement: -.003 (.001)	enhancement[§]: -.005, -.001
Paths to past six-month alcohol use				
Positive AE → enhancement motives	.051 (.007)***	.040 (.008)***	enhancement: .011 (.005)	enhancement[§]: .002, .021
Negative AE → enhancement motives	-.041 (.018)*	-.023 (.018)	enhancement: -.017 (.006)	enhancement[§]: -.034, -.008
Social SE → coping and enhancement motives	-.020 (.004)***	-.015 (.004)***	Total: -.005 (.001)	Total[§]: -.008, -.003
			coping: -.001 (.001)	coping[§]: -.003, -.000
			enhancement: -.004 (.002)	enhancement[§]: -.007, -.001
Negative SE → social, coping, and enhancement motives	-.010 (.003)***	-.003 (.003)	Total: -.007(.002)	Total[§]: -.010, -.004
			social: -.001 (.001)	social[§]: -.003, -.000
			coping: -.002 (.002)	coping: -.005, .001
			enhancement: -.003 (.001)	enhancement[§]: -.006, -.001

Note. Positive AE, Negative AE, Social SE, and Negative SE refer to positive alcohol expectancy, negative alcohol expectancy, social self-efficacy, and negative self-efficacy, respectively. 95% CI of the indirect effect was 95% bias-corrected bootstrap confidence interval generated by 1000 bootstrap samples. Age, gender, and parents' monthly income level were controlled in all analyses. [a]Past six-month alcohol use was also controlled. [§]Denotes a significant mediation.

*p < .05; **p < .01; ***p < .001.

Table4. *Drinking motives mediating the associations between alcohol expectancies and drinking refusal self-efficacy and alcohol-related outcomes (continued)*

Mediation paths to alcohol outcomes	Total effect	Direct effect	Indirect effect	
	Estimate (S.E.)	Estimate (S.E.)	Estimate (S.E.)	95% CI
Paths to past 30-day heavy drinking				
Negative AE → enhancement motives	-.015 (.036)	.009 (.037)	enhancement: -.024 (.010)	enhancement[§]: -.050, -.009
Social SE → social, coping, and enhancement motives	-.016 (.007)*	-.002 (.009)	Total: -.015 (.006)	Total[§]: -.026, -.003
			social: -.007 (.005)	social: -.017, .005
			coping: -.003 (.002)	coping[§]: -.007, -.000
			enhancement: -.005 (.003)	enhancement: -.012, .000
Negative SE → social, coping, and enhancement motives	-.018 (.005)***	-.010 (.006)	Total: -.010 (.004)	Total[§]: -.017, -.002
			social: -.002 (.001)	social: -.005, .000
			coping: -.004 (.004)	coping: -.010, .003
			enhancement: -.004 (.002)	enhancement: -.008, .001
Paths to past six-month heavy drinking				
Negative AE → enhancement motives	-.038 (.039)	-.017 (.040)	enhancement: -.020 (.010)	enhancement[§]: -.043, -.005
Social SE → coping motives	-.030 (.008)***	-.026 (.008)***	coping: -.005 (.002)	coping[§]: -.010, -.002
Negative SE → social and coping motives	-.020 (.006)**	-.011 (.007)	Total: -.010 (.004)	Total[§]: -.017, -.002
			social: -.002 (.001)	social[§]: -.006, -.000
			coping: -.007 (.004)	coping: -.014, .000
Paths to alcohol-related problems[a]				
Positive AE → coping motives	.016 (.003)***	.002 (.003)	coping: .008 (.002)	coping[§]: .005, .011
Social SE → coping motives	-.005 (.002)**	-.004 (.002)**	coping: -.001 (.000)	coping[§]: -.002, -.000
Negative SE → coping motives	-.006 (.001)***	-.004 (.001)***	coping: -.002 (.001)	coping[§]: -.003, -.001

Note. Positive AE, Negative AE, Social SE, and Negative SE refer to positive alcohol expectancy, negative alcohol expectancy, social self-efficacy, and negative self-efficacy, respectively. 95% CI of the indirect effect was 95% bias-corrected bootstrap confidence interval generated by 1000 bootstrap samples. Age, gender, and parents' monthly income level were controlled in all analyses. [a]Past six-month alcohol use was also controlled. [§]Denotes a significant mediation. *$p < .05$; **$p < .01$; ***$p < .001$.

CONCLUSION

To address the emerging issue of college student drinking in China, guided by the social ecological model (Bronfenbrenner, 1979; Sallis, et al., 2008) and related theories, we conducted three studies to investigate the effects of culture, peer influence, and cognition on alcohol use among Chinese undergraduate students. Results of these studies showed that Western culture was a significant factor affecting alcohol use by Chinese college students. Perceived alcohol use of two peer referents, particularly perceived average student alcohol use, was an important correlate of individual alcohol use. The significance of alcohol expectancies, drinking refusal self-efficacy, and drinking motives for alcohol use among Chinese college students was also demonstrated.

Within the context of globalization, people in non-Western societies are experiencing cultural changes largely caused by Westernization or Americanization (Scholte, 2000). Unfortunately, most prior research on the influence of culture on alcohol use among younger populations has focused on minority adolescents and college students in Western societies (Hendershot, et al., 2005; Le, et al., 2009; Luk, et al., 2013; Schwartz, et al., 2013). To address this issue, Study 1 investigated the moderating and mediating mechanisms by which Western and Chinese culture may affect Chinese college students' alcohol-related behaviors. The findings showed that Western cultural orientation attenuated the effect of perceived best friend use on individual alcohol use, and enhanced the effect of perceived average student use on individual alcohol use. These results suggest that Western culture may serve as a risk factor affecting alcohol use among Chinese college students through moderating peer influences. Therefore, it is important to develop a theoretical framework to guide future research in Chinese college students. As research on acculturation and health-related outcomes in American minority adolescents (Castro & Alarcón, 2002; Pantin, et al., 2004) has shown, theory development

may help to delineate the interactive processes between Western culture and school, family, and peers contributing to alcohol use by Chinese college students. Research has revealed that there were similarities in the associations between immigration-based and globalization-based acculturation and psychological outcomes (Chen, et al., 2008). Thus, more theory-based research with non-Western, younger populations may help to compare and integrate findings in Western and non-Western societies to further our understanding of the influence of culture on alcohol use.

Study 2 filled the gap that no prior research has studied perceived peer norms among Chinese college students. The findings showed that, although participants did not perceive peers drank more alcohol than themselves, the associations between perceived peer norms and alcohol-related outcomes, including the association between self-other-discrepancy (SOD) for alcohol use and individual alcohol use, are consistent with research findings in college students in Western societies (Baer, et al., 1991; Carey, et al., 2006; Fran ça, et al., 2010; Perkins, 2007; Perkins & Berkowitz, 1986; Yusko, et al., 2008). These results suggest that, if further research finds an overestimation of peer drinking norms in Chinese college students, as has been reported in most prior research, the social norms approach may be applicable to Chinese college students.

Additionally, findings of Study 2 suggest that SOD for alcohol use warrants more research. The results showed that SOD for alcohol use by the distal peer referent, not SOD for alcohol use by the proximal referent, was related to past 30-day and past six-month alcohol use. This is in contrast with prior findings in American college students, i.e., perceived norms of proximal referents were more influential for alcohol use than those of distal referents (Baer, et al., 1991; Campo, et al., 2003; LaBrie, et al., 2010; Thombs, et al., 2005; Yanovitzky, et al., 2006). Nonetheless, our results also showed that perceived alcohol use of the proximal referent had a stronger effect on individual alcohol

use than perceived alcohol use of the distal referent in males, while the opposite was true in females. Taken together, these results suggest that SOD for alcohol use may help to reveal the true relationship between perceived peer norms and alcohol use, because the direct measure of perceived peer norms may largely be a proxy of individual drinking behaviors due to behavioral projection. Similarly, previous research has reported that SOD for alcohol use was more influential for alcohol use among college students than perceived peer use (Carey, et al., 2006; Perkins & Berkowitz, 1986), which also suggests that SOD for alcohol use needs more research.

Guided by the evidence that alcohol expectancies and drinking refusal self-efficacy are associated with drinker types among Chinese adolescents (Qian, et al., 2008; Shell, et al., 2010), Study 3 focused on three established cognitive factors for alcohol use among college students, i.e., alcohol expectancies, drinking refusal self-efficacy, and drinking motives (Baer, 2002; Evans & Dunn, 1995; Ham & Hope, 2003; Oei & Jardim, 2007; Young, et al., 2006). The findings showed that positive alcohol expectancy was a particularly important factor affecting alcohol use, and drinking refusal self-efficacy mainly affected alcohol-related problems. Drinking motives were not found to be more influential for alcohol-related outcomes than alcohol expectancies and drinking refusal self-efficacy, however. Possibly due to low statistical power, drinking refusal self-efficacy was not found to be a moderator of alcohol expectancies, but the majority of hypothesized mediated effects via drinking motives were significant. The patterns of the associations among alcohol expectancies, drinking refusal self-efficacy, and drinking motives and alcohol-related problems are consistent with research among college students in Western societies, although the magnitude of these associations was relatively small compared with that reported in previous research. Together, these findings suggest that alcohol expectancy theory, social learning theory, and the motivational model of alcohol

use are applicable to Chinese college students, and replication research is necessary to address the unresolved issues and inform interventions.

One major unexpected finding of these three studies was the low explanatory power of the predictors in relation to alcohol-related outcomes, as shown by the small R-square changes in alcohol use and in alcohol-related problems, and the small ORs associated with heavy drinking. There are two possible reasons contributing to these unexpected findings. First, methodological issues may be part of the reason. The alcohol expectancy scale (Zhang, 2003) and the drinking refusal self-efficacy scale (Zhang, 2003) have not been subjected to vigorous scale validation, and the validity of the related constructs may be limited. It is also possible that the behavioral assessments did not apply very well to Chinese college students, and many participants may have provided inaccurate estimations of alcohol use. Nonetheless, to better assess alcohol use, we used beverage-specific questions and the quantity-frequency method recommended for assessing alcohol use among infrequent drinkers (Dawson, 1998, 2003; Feunekes, et al., 1999). Further research should investigate the validity of these behavioral assessments in Chinese college students. Second, sample characteristics may also be part of the reason. The median past six-month alcohol use was only about 20 drinks. The homogeneity of this college sample may have caused range restrictions in alcohol-related outcomes and associated psychosocial correlates, and the strength of the associations among study variables may have been attenuated. To address this possible cause of range restrictions, further research with more representative samples is needed.

Major limitations of these three studies include the cross-sectional research design, the unrepresentative sample obtained from a single college, and the reliance on self-reported data. Therefore, causal associations among study variables cannot be inferred, and research findings cannot

be generalized to the Chinese college student population. Nonetheless, these studies also had three strengths. First, to provide a comprehensive understanding of factors affecting alcohol use among Chinese college students, major psychosocial correlates of alcohol use by college students at three levels of the environment were investigated (i.e., culture, peer influence, and cognition). Second, several gaps in previous research were addressed in these studies, including culture moderating the effect of peer influence on alcohol use in non-Western college students, drinking refusal self-efficacy mediating the associations between perceived peer norms and alcohol use, and drinking motives mediating the effects of drinking refusal self-efficacy on alcohol use. Finally, to address the issue that most prior research with Chinese student samples has only assessed drinking frequency, multiple indicators of alcohol use recommended in research (World Health Organization, 2000) were used in these studies. Total alcohol consumption was obtained by assessing drinking frequency and quantity of three alcoholic beverages most commonly consumed by Chinese. Heavy drinking, one major drinking pattern among Chinese college students and other young adults (Martinic & Measham, 2008), and alcohol-related problems were also evaluated.

The current studies provided three implications for future research and interventions. First, the study findings supported or indicated the utility of related theories for studying college drinking in China, including the cultural values paradigm, social learning theory, alcohol expectancy theory, and the motivational model of alcohol use. Future research may benefit from using more representative samples to replicate the present findings and address the issue of low explanation of alcohol-related outcomes. Second, the present findings suggested several empirical questions for further investigation. For example, future research may investigate whether collectivism contributes to more alcohol use among Chinese college students through moderating peer influence, and whether alcohol expectancies,

drinking refusal self-efficacy, and drinking motives play significant roles in heavy drinking by Chinese college students. Third, the present findings provided preliminary evidence for potential future application of interventions developed for college populations in Western societies to Chinese college students, such as the social norms approach and alcohol expectancy challenge. Thus, further research may also investigate the applicability of these intervention strategies to Chinese college students.

To conclude, these three studies took a first step in understanding major psychosocial correlates of alcohol use among Chinese college students. The present findings showed that, consistent with findings in college populations in Western societies, Chinese college students' drinking behaviors were affected by perceived peer norms and alcohol-related cognition. Additionally, Western culture was a significant contextual factor affecting alcohol use by Chinese college students. Together, these studies provided empirical support for the utility of related theories developed in Western populations to college students in China. Moreover, these studies extended prior research by investigating several possible moderating and mediating processes of the relationship among culture, peer influence, cognition, and alcohol use. Findings of these studies provide important implications for theory development, empirical research, and interventions for college drinking in China. More research of Chinese college students is needed to replicate and extend the present findings and to address empirical questions suggested by these studies.

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APPENDIX. Survey Questionnaire.

Ⅰ. The following statements are people's opinions about the effects of alcohol. According to your own opinions and experiences, if you think that the description is correct or basically correct, please choose 'Yes'; if you think that the description is wrong or basically wrong, please choose 'No'. 'Drinking alcohol' in these statements refers to drinking any alcoholic beverages such as beer, spirits, wine, whiskey, vodka, rum etc.

		①	②
		Yes	**No**
1.	Drinking alcohol can eliminate a person's feeling of inferiority.	□	□
2.	Drinking alcohol can eliminate nervousness.	□	□
3.	Drinking alcohol makes people to be more humorous.	□	□
4.	Alcohol can make people to relax their minds.	□	□
5.	Drinking alcohol can embolden people to speak in public.	□	□
6.	Drinking alcohol makes people tend to quarrel irrationally with others.	□	□
7.	People tend to run into trouble with others after drinking alcohol.	□	□
8.	Drinking alcohol can relieve people from loneliness and boredom.	□	□
9.	Drinking alcohol can help to get on well with people of your opposite sex.	□	□
10.	Drinking alcohol makes a person to lose self-control easily and do things he does not intend to do.	□	□
11.	Drinkers often forget what they have done while they are drinking alcohol.	□	□
12.	Drinking alcohol makes it easier for people to get along with others.	□	□
13.	Alcohol can make a person become more fun while dating.	□	□
14.	Drinking some alcohol can make it easy for a person to have candid conversations with others.	□	□
15.	Drinking alcohol makes people to become more confident.	□	□
16.	Drinkers tend to yell loudly and do crazy things.	□	□
17.	Drinking alcohol can make people feel more romantic.	□	□
18.	Drinking alcohol can makes people do not feel nervous while standing before the public.	□	□

		①	②
		Yes	**No**
19.	People would behave weirdly and stupidly while drinking alcohol.	□	□
20.	Alcohol can help people to relax and alleviate nervousness.	□	□
21.	Drinking alcohol can show a person's heroic character or charm.	□	□
22.	Drinking alcohol makes people feel easier to get close to others.	□	□
23.	Drinking alcohol can make people relax.	□	□
24.	Drinking alcohol can make people to forget worries.	□	□
25.	Drinking alcohol makes people feel great.	□	□
26.	Drinking alcohol would make others to have a bad impression about you.	□	□
27.	Alcohol increases vitality, making people feel more energetic and powerful.	□	□
28.	Drinking alcohol makes a person become more satisfied with himself.	□	□
29.	Drinking alcohol can make a person become excited.	□	□
30.	Drinking alcohol would bring trouble.	□	□
31.	Drinking alcohol can make a person to mingle with others easily.	□	□
32.	People tend to fail or procrastinate while drinking alcohol.	□	□
33.	Drinking alcohol makes people feel not lonely any more.	□	□
34.	Drinking alcohol makes a person's driving skills go wrong.	□	□
35.	Alcohol is so wonderful.	□	□
36.	Drinking alcohol is a good method to release a person's emotions.	□	□
37.	Drinking alcohol makes a student cannot do well with academic tasks.	□	□
38.	Many people become bankrupt because of their drinking habits.	□	□

		① **Yes**	② **No**
		□	□
39.	When a person toasts to you, you would humiliate him if you do not drink.	□	□
40.	Only people who drink alcohol can handle socializing very well.	□	□
41.	There are people who lose their homes, wives and children because of their frequent drinking.	□	□
42.	Drinking alcohol makes people feel comfortable and enjoyable.	□	□
43.	Alcohol enables people to express their opinions bravely.	□	□
44.	Drinking alcohol makes people happier while being alone.	□	□
45.	When other people persuade you to drink alcohol, you cannot refuse, or else it will harm your friendship.	□	□
46.	It is a good diversion to drink some alcohol during holidays.	□	□
47.	Sometimes a person needs to drink alcohol to facilitate fitting in with a group.	□	□
48.	Drinking some alcohol can make a person care less about other people's opinions.	□	□
49.	People would become sexier after having some alcohol.	□	□
50.	People become more kind and generous after having some alcohol.	□	□
51.	Drinking alcohol can increase a person's sexual desire or interests in sex.	□	□
52.	A person would want to drink alcohol when he encounters difficulties.	□	□
53.	Drinking some alcohol can make a person to become invigorated.	□	□
54.	Drinking some alcohol can make a person become brave enough to talk with people of his (her) opposite sex.	□	□

		①	②
		Yes	**No**
55.	Drinking alcohol helps sleep.	□	□
56.	Drinking alcohol can make it easier for a person get on well with others and feel better about the world.	□	□
57.	Drinking alcohol can make a person worry less.	□	□

Ⅲ. The following is a list of reasons people give for drinking alcohol. Thinking of all the times you drink, how often would you say that you drink for each of the following reasons?

		① almost never/ never	② some of the time	③ half of the time	④ most of the time	⑤ almost always/ always
1.	To forget your worries	□	□	□	□	□
2.	Because your friends pressure you to drink	□	□	□	□	□
3.	Because it helps you enjoy a party	□	□	□	□	□
4.	Because it helps you when you feel depressed or nervous	□	□	□	□	□
5.	To be sociable	□	□	□	□	□
6.	To cheer up when you are in a bad mood	□	□	□	□	□
7.	Because you like the feeling	□	□	□	□	□
8.	So that others won't kid you about not drinking	□	□	□	□	□
9.	Because it's exciting	□	□	□	□	□
10.	To get high	□	□	□	□	□
11.	Because it makes social gatherings more fun	□	□	□	□	□
12.	To fit in with a group you like	□	□	□	□	□
13.	Because it gives you a pleasant feeling	□	□	□	□	□
14.	Because it improves parties and celebrations	□	□	□	□	□
15.	Because you feel more self-confident and sure of yourself	□	□	□	□	□
16.	To celebrate a special occasion with friends	□	□	□	□	□
17.	To forget about your problems	□	□	□	□	□
18.	Because it's fun	□	□	□	□	□
19.	To be liked	□	□	□	□	□
20.	So you won't feel left out	□	□	□	□	□

Ⅳ. The following are some circumstances that a drinker often encounters. Imagine that you are under these circumstances, how much confidence do you have to resist drinking alcohol?

Key:					
①	②	③	④	⑤	⑥
I have no confidence at all	I have 20% confidence	I have 40% confidence	I have 60% confidence	I have 80% confidence	I have 100% confidence

	①	②	③	④	⑤	⑥
1. When there's a conflict at home.	□	□	□	□	□	□
2. When I cannot fall sleep.	□	□	□	□	□	□
3. When I'm quarrelling with friends.	□	□	□	□	□	□
4. When nobody seems to like me.	□	□	□	□	□	□
5. When I hang out with friends and they suggest having some alcohol.	□	□	□	□	□	□
6. When I want to feel more comfortable at a party.	□	□	□	□	□	□
7. When I worry that I cannot finish my work on time.	□	□	□	□	□	□
8. When somebody is interfering with my plan.	□	□	□	□	□	□
9. When I feel sleepy but want to remain fresh.	□	□	□	□	□	□
10. When I have frictions with people at work.	□	□	□	□	□	□
11. When I feel uncomfortable in a crowd.	□	□	□	□	□	□
12. When I attend a party and people around me are all drinking.	□	□	□	□	□	□
13. When I pass a store selling alcohol.	□	□	□	□	□	□
14. When I'm feeling nausea.	□	□	□	□	□	□
15. When I'm very angry because everything goes wrong.	□	□	□	□	□	□
16. When other people are unfair to me.	□	□	□	□	□	□
17. When I meet my friend and he invites me to have a drink.	□	□	□	□	□	□

Key:

①	②	③	④	⑤	⑥
I have no confidence at all	I have 20% confidence	I have 40% confidence	I have 60% confidence	I have 80% confidence	I have 100% confidence

	①	②	③	④	⑤	⑥
18. When I am angry but do not want to show my anger.	□	□	□	□	□	□
19. When I'm with my close friends and feel very relaxing and enjoyable.	□	□	□	□	□	□
20. In a celebrating banquet.	□	□	□	□	□	□
21. When someone is criticizing me.	□	□	□	□	□	□
22. When close friends gather together and want to have great fun.	□	□	□	□	□	□
23. When I go out to dine at restaurants and my companion orders alcohol.	□	□	□	□	□	□
24. When I feel puzzled and don't know what I should do.	□	□	□	□	□	□
25. When I feel very upset and want to forget my troubles temporarily.	□	□	□	□	□	□
26. When my friend toasts to me.	□	□	□	□	□	□
27. When my friend shows that he's unpleasant and I feel that I have to drink.	□	□	□	□	□	□
28. When I want to have great fun.	□	□	□	□	□	□
29. When I want to please my friends.	□	□	□	□	□	□
30. When people around me make me feel very nervous.	□	□	□	□	□	□
31. When I do not get on well with my colleagues.	□	□	□	□	□	□
32. When friends gather together and want to socialize and cultivate friendly atmosphere.	□	□	□	□	□	□
33. When I go out for fun with friends and we want to go crazy.	□	□	□	□	□	□
34. When my boss keeps on demanding on all sorts of things and I feel great pressure.	□	□	□	□	□	□

Ⅴ. For the following statements, you would find that some people may use them to describe themselves. Please read carefully each statement and decide whether it can be used to describe you. If you agree with a certain description and think that it can be used to describe you, please choose 'Yes'; if you disagree with it and think that it cannot be used to describe you, please choose 'No'. There are no right or wrong answers. Please make choices according to your true feelings.

		①	②
		Yes	**No**
1.	I like 'wild' uninhibited parties.	□	□
2.	I sometimes like to do things that are a little frightening.	□	□
3.	I'll try anything once.	□	□
4.	I tend to change interests frequently.	□	□
5.	I sometimes do 'crazy' things just for fun.	□	□
6.	I prefer friends who are excitingly unpredictable.	□	□
7.	I like doing things just for the thrill of it.	□	□
8.	I like to have new and exciting experiences and sensations even if they are a little frightening.	□	□
9.	I would like to take off on a trip with no preplanned or definite routes or timetables.	□	□
10.	I like to explore a strange city or section of town by myself, even if it means getting lost.	□	□
11.	I would like the kind of life where one is on the move and traveling a lot, with lots of change and excitement.	□	□

Ⅵ. Please choose your attitudes for the following statements.

Key:				
①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

		①	②	③	④	⑤
1.	I would like to living in western countries.	□	□	□	□	□
2.	I prefer to celebrate western holidays than Chinese holidays.	□	□	□	□	□
3.	I would be happy if there are no disagreements between my friends and me.	□	□	□	□	□
4.	I would borrow money if I did not have money enough to buy something.	□	□	□	□	□
5.	I appreciate the equal relationship between parents and their children in western culture.	□	□	□	□	□
6.	I enjoy western music (Rock, Jazz, Pop, etc.).	□	□	□	□	□
7.	I enjoy my personal style in clothing.	□	□	□	□	□
8.	I can’t accept the concept of unplanned consumption (spending in advance).	□	□	□	□	□
9.	I hope I am unanimous with others in my group in most of cases.	□	□	□	□	□
10.	I like having a cool hairstyle.	□	□	□	□	□
11.	I believe that the west should learn many things from China.	□	□	□	□	□
12.	I think that the broad and depth of Chinese culture are that western culture is unable to compete (compare) with.	□	□	□	□	□
13.	I prefer western restaurants or fast food restaurants with western atmosphere to Chinese restaurants.	□	□	□	□	□

Key:				
①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

		①	②	③	④	⑤
14.	I like the dress style of some stars.	□	□	□	□	□
15.	I think I would be more attractive in brand clothes.	□	□	□	□	□
16.	I give priority to group interests other than individual ones.	□	□	□	□	□
17.	I hope I can live independently just as young foreigners do.	□	□	□	□	□
18.	I like to get my hair dyed to look better.	□	□	□	□	□
19.	I would count every cent when buying something.	□	□	□	□	□
20.	I wouldn't take suggestions or comments from my friends or classmates.	□	□	□	□	□
21.	I admire those Chinese studying and working in western countries.	□	□	□	□	□
22.	I appreciate the value "collectivism" Chinese culture has.	□	□	□	□	□
23.	I rather buy something that makes me happy than deposit money in banks.	□	□	□	□	□
24.	Compared with Chinese holidays, I appreciate western holidays more.	□	□	□	□	□
25.	Even if I had a high monthly salary later, I would still save more and spend less.	□	□	□	□	□
26.	When individual interests and group interests conflict with each other, I would give up my individual ones.	□	□	□	□	□

Key:				
①	②	③	④	⑤
Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree

		①	②	③	④	⑤
27.	I think high spending is OK as long as you can afford.	□	□	□	□	□
28.	I think western etiquette is more appropriate than eastern one for today's society.	□	□	□	□	□
29.	I believe that Chinese traditional arts are treasures of the world.	□	□	□	□	□
30.	Due to China's status in the world today, I am not proud of China.					
31.	Fashionable clothing makes me feel cool.	□	□	□	□	□
32.	I am proud of Chinese long history.	□	□	□	□	□
33.	I am proud of being a Chinese.	□	□	□	□	□
34.	I would spend thriftily on food and expenses to save money.	□	□	□	□	□
35.	Due to China's status in the world today, I am proud of China.	□	□	□	□	□
36.	I believe that Chinese are more industrious and brave than westerners.	□	□	□	□	□
37.	When my opinions conflict with my friends', I would be more likely to go with them.	□	□	□	□	□
38.	I will not live on loan like westerners do, even I have decent job in the future.	□	□	□	□	□
39.	I appreciate the context of western culture that emphasizes on freedom and taking ease life.	□	□	□	□	□