THE COMPOSITIONAL AND STRUCTURAL CHARACTERISTICS OF GAMBLERS’ SOCIAL NETWORKS

by

MATTHEW KIRWIN MEISEL

(Under the Direction of Adam S. Goodie)

ABSTRACT

Individuals who are friends with others who participate in substance use are at a higher risk of engaging in similar behaviors. Two studies investigated the compositional and structural aspects of gamblers’ social networks. Study 1 recruited gamblers from the community, whereas Study 2 recruited college student gamblers. The current studies utilized an egocentric social network design in which the participant enumerated the closest people in his life, and the relationship among the people named. Pathological gamblers (PGs) had more gamblers and gambling “buddies” in their networks compared to nonpathological gamblers (NPGs). Furthermore, both studies found homophily in gamblers’ networks, although there were differences in network density, such that college PGs’ networks were significantly denser than NPG’s networks, but there were no differences in the community sample. This suggests that college PGs form dense networks that reinforce their own gambling behavior but that over time, these networks dissolve.

INDEX WORDS: Social network analysis, Pathological Gambling, Egocentric, Network structure, Network composition
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CHAPTER 1
INTRODUCTION

Social factors are implicated in the initiation of substance use and in the progression to problematic use. Furthermore, there is increasing evidence that the presence of others increases the magnitude of substance use. For example, the majority of college students who smoke have been found to smoke mainly in the presence of others (Waters, Harris, Hall, Nazir, & Waigandt, 2006). Regarding gambling, when individuals believed that other people were gambling and winning, they played for longer periods of time resulting in greater losses (Rockloff & Dyer, 2007). Similarly, the engagement of substance use with others has been associated with problematic use. College students who participate in drinking games are more likely to have negative consequences due to alcohol, such as higher rates of use, driving under the influence, and binge drinking (Borsari, 2004; Farrow, 1987; Johnson, Wendel, & Hamilton, 1998). Given the fundamental importance of social factors as a primary motive to engage in substance use and that the presence of others intensifies the magnitude of substance use, it is necessary to utilize a multi-faceted approach to study the effect of others on an individual’s substance use.

In the overarching research on motives to gamble, social factors are a primary reason to gamble for younger and older adults (Hope & Havir, 2002; Mississippi State University Gambling Group, 1995; Neighbors et al., 2002). For example, socialization was the fourth most frequent reason to gamble, behind to win money, have fun, and excitement (Neighbors et al., 2002; Wickwire, 2007). Furthermore, for older adults, the most frequent response on reasons to
gamble was socialization, suggesting the importance of examining the impact of social factors on pathological gambling (PG; Hope & Havir, 2002)

PG is currently classified as an impulse-control disorder characterized by a preoccupation with gambling, lying to others to get money to gamble, and a need to chase one’s losses (American Psychiatric Association, 1994). Because of the similarities between PG and substance use disorders, the DSM-5 will categorize PG under Substance Use and Addictive Disorders (American Psychiatric Association, 2012). As indicated above, gambling, smoking, and drinking are similar in the effect of the presence of others on the frequency of engagement.

PG also frequently co-occurs with alcohol abuse and nicotine dependence. For example, in the 1998 St. Louis Epidemiological Catchment Area study, a majority of problem gamblers suffered from nicotine dependence, and at least a third of problem gamblers abused alcohol or used illicit drugs (Cunningham-Williams, Cottler, Compton III, & Spitznagel, 1998). The comorbid nature of PG has been examined in the college population. Gambling pathology, based on the SOGS, has been associated with and predicts tobacco, alcohol, and illegal drug use (Lesiuer et al., 1991; Ladouceur, 1994; Engwall, Hunter, & Steinberg, 2004). Furthermore, gambling pathology has been associated with other risky behaviors such as unprotected sex and binge eating (LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Engwall et al., 2004).

Social network analysis (SNA) is a promising method that examines the social networks of individuals, which has been used to examine obesity, happiness, and substance use (Christakis & Fowler, 2007; Fowler & Christakis, 2008; Rosenquist, Murabito, Fowler, & Christakis, 2010; Christakis & Fowler, 2008). Two commonly used methods in social network analysis are sociocentric and egocentric. In a sociocentric design, information is gathered from every member of the network whereas in an egocentric design, information is gathered from only one member
of a network and this individual indicates the behaviors of others in his or her network. In egocentric SNA terms, the focal individual is referred to as the ego and the people listed in his or her network are referred to as alters.

SNA examines the compositional and structural components of social networks. Network composition refers to the characteristics of individuals in a network. These include socio-demographical (age, race, gender), and behavioral traits (percentage of gamblers, smokers, and drinkers in a network). The indices that comprise network structure are based off of the presence or absence of a tie between alters, and these indices are homophily, density, and centrality which will be discussed later.

Network composition

Although not studied using SNA, the composition of gamblers’ networks has been examined using other techniques. The majority of research has utilized younger populations, specifically focusing on the effects of family members’ and peers’ substance use. Adolescent at-risk and probable pathological gamblers (PPGs) report higher rates of substance use and gambling severity by their friends and family members (Hardoon, Gupta, & Derevensky, 2004). Concurrently, the most significant predictor for adolescent gambling is parental gambling (Winters, Stinchfield, Botzet, & Anderson, 2002). Conversely, in a college sample, peer lottery playing was not related to gambling frequency, although college students were more likely to play the lottery when their parents engaged in lottery play (Browne and Brown, 1994). A recent study by Fortune and colleagues (2012) examined a similar technique to SNA, and found that PG was associated with a higher incidence of peer gambling frequency and expenditure.
In studies that have utilized SNA, the composition of the network has been shown to affect an individual’s behavior. For example, Ennett and colleagues (2006) recently utilized a longitudinal design to examine the impact of peer substance use. They found that proximity affected substance use, such that adolescents had higher odds of substance use if their best friend and the people that the adolescent were closest to engaged in the behavior (Ennett et al., 2006). Accordingly, having at least one best friend who currently smoked cigarettes significantly increased the likelihood of smoking of the focal individual (Alexander, Piazza, Mekos, & Valente, 2001). Thus, the closer an individual is to others who engage in substance use, the more likely he or she is to engage in similar behaviors.

Network structure

SNA not only provides information on the compositional aspects of a respondent’s network but the structural components as well. These structural aspects include homophily, network density, and degree centrality. Although network structure has been examined with individuals who inject heroin, drink, and smoke, there is no research with individuals who gamble (Koram et al., 2011; Rosenquist et al., 2010; Christakis & Fowler, 2008).

Homophily is the tendency of individuals who are similar in their beliefs, attitudes, and behaviors to be more frequently and closely linked in social networks than those who are dissimilar (McPherson, Smith-Lovin, & Cook, 2001). Homophily has been associated with social networks that are comprised of individuals who are similar in socio-demographical and behavioral characteristics. For example, in a study with an adult population, the majority of close friends were within eight years of the respondent (Fischer, 1977). Furthermore, education has been shown to be a strong predictor of homophily, such that college educated individuals tend to
be more closely connected to other individuals who attended college. Consistently, individuals who did not attend college tend to be connected to other individuals who did not attend college (Marsden, 1988). This effect has also been shown in the substance use literature. For example, drinkers are more connected to others who drink and tobacco users are more connected to others who smoke cigarettes (Rosenquist et al., 2010; Christakis & Fowler, 2008).

It is surprising that homophily has not been studied with gamblers considering that it may be the basis for network composition. If individuals prefer to be more frequently and closely linked to similar others, then gamblers should have more gamblers in their networks. Furthermore, since PG is highly comorbid with other substances, PGs’ networks should be comprised of higher frequencies of alter smoking and drinking. Based on these assumptions, I posit that greater frequencies of drinking, smoking, and gambling will be evident in PGs’ networks, and that the PG ego will engage in joint behaviors with alters more frequently than the NPG ego.

PG may also be associated with degree centrality. Degree centrality is a measure of popularity, such that an alter is highly central if he or she is directly connected to many other alters. There has been an abundance of research utilizing sociocentric social network designs in youth samples due to the set boundaries of the school system. Since most individuals are friends with other individuals who attend the same school, sociocentric designs have been utilized in adolescent populations. In these sociocentric designs, information is gathered from every member of a school resulting in a full picture of the network. Alexander and colleagues (2001) found that the substance use of the most popular members reflected the substance use of the full network. That is, schools with the highest rates of student substance use tended to have the most popular members engage in substance use. At schools where the popular members had low
substance use, the entire school had lower rates of substance use. Somewhat similarly, Ennett and colleagues (2006) found that the most central members engaged in substance use. This finding may have arisen due to the high prevalence of substance use in the school, although the overall rate of substance use in that school was not provided. Combining the knowledge between the comorbidity of PG and the effect of context on behavior, I posit that in PGs’ networks, the most central members will engage in more frequent substance use than those who are central in NPGs’ networks.

The final component of network structure that will be discussed is network density. Network density is the proportion of ties that exist in a network over all possible connections. Higher scores indicate that members of a network are well-connected with each other whereas lower scores indicate that members of a network do not know one another. There is scant research on the relationship between network density and substance use. Adolescents within high density networks have been found to have lower odds of both cigarette and marijuana use but not alcohol use. The authors posited that a close, core network is a protective factor against substance use (Kobus & Henry, 2010; Henry & Kobus, 2007). In a study with individuals who inject heroin and individuals who administer heroin in other ways, the authors found no differences in network density between the groups (Koram et al., 2011). Based on these studies, I have no a priori hypothesis on the role of network density and ego gambling pathology.

The effect of peer and family members’ substance use on an individual’s own substance use has been widely documented in the alcohol, tobacco, and gambling literature but the current studies will be the first studies to utilize a relatively new method of analyzing the effect of peer and family members’ substance use on an individual’s own gambling behavior (Borsari, 2004; Waters et al., 2006; Hardoon et al., 2004). The current studies utilize an egocentric social
network approach in which the participant (referred to as the “ego” in social network
terminology) enumerates his or her closest friends, family members, or co-workers (referred to
as “alters”) and the relationships among these individuals. The current studies are the first to
apply social network analysis to pathological gambling (PG).

To summarize my hypotheses, there will be significant differences in network
composition and structure between the networks of PGs and NPGs. First, regarding network
composition, PGs’ networks will have greater rates of substance use and will be comprised of
more alters that the ego engages in substance use with. Second, regarding network structure,
individuals who gamble will be more connected to other individuals who gamble; evidence of
homophily. Third, alters who engage in gambling, smoking, and drinking are more likely to be
central in PGs’ networks. Graphs 1 and 2 are hypothetical representations of PGs’ and NPGs’
networks.
CHAPTER 2
METHODS AND RESULTS

The majority of research on the effect of peer and family gambling on an individual has focused on adolescents with a paucity of research on younger and adult populations. Furthermore, the majority of research on network structure is with adolescent populations focusing on alcohol and tobacco use but not gambling. The primary aims of the current studies were to examine the structural and compositional components of gamblers’ social networks in a college (Study 1) and adult sample (Study 2). Although network composition has been studied with gamblers, the current studies are the first that examined the structural aspects of gamblers’ social networks. Specifically, three structural components (homophily, network density, and degree centrality) were investigated to determine their relationship with gambling, smoking, and drinking.

Methods

Participants

Study 1. The sample consisted of 40 frequent gamblers recruited from the community in Athens, GA. The majority of the sample was male (75%) and African American (72.5%). The sample also consisted of Caucasians (25%) and one person self-identified as mixed race (2.5%). Participants were an average age of 35.25 years (SD=11.09). Participants were compensated $20 for the two-hour study. Exclusion criteria were gambling less than weekly, currently living with
another participant, inability to use a computer, self-reported symptoms of psychosis, or age greater than 65 years.

**Study 2.** The sample consisted of 252 undergraduates enrolled in a lower-level psychology course at a large Southeastern school. The final sample consisted of 239 (149 male, 1 missing) participants after removing participants either with missing data, for lack of effort, or due to computer errors. The participants ages ranged from 18 to 33 with a mean age of 19.67 (SD= 1.645). The majority of the sample was Caucasian (70.3%) followed by Asian (13.0%) and African American (11.7%). Participants were compensated with course credit for participating in the current study. Exclusion criteria were less than 18 years old and gambling less than every other week.

**Measures.**

**Gambling Severity Assessment.** In Study 1, two clinical interviews assessed gambling pathology based on DSM-IV criteria. These interviews were the Diagnostic Interview for Gambling Severity (DIGS; Winters, Specker, & Stinchfield, 1996) and the Structured Clinical Interview for Pathological Gambling (SCI-PG; First, Spitzer, Gibbon, & Williams, 2002). For the purpose of the current study, I used a conservative diagnosis which stated that to be considered pathological, participants had to score at least 5 on both measures. Based on this conservative diagnosis, 18 participants met criteria for PG and 22 participants did not.

In Study 2, the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) was used to assess gambling severity. The SOGS is a well-validated measure of probable pathological gambling (PPG) (Lesieur & Blume, 1987). Furthermore, the SOGS has high internal reliability ($r = .97$) and validity ($r = .86$). To keep consistency between the two studies, a score of 5 or more was indicative of PPG while a score of 4 or less indicated non-pathological gambling (NPG).
The final sample consisted of 90% non pathological gamblers (NPGs, N = 215) and 10% probable pathological gamblers (PPGs, N = 24).

Social network questionnaire. Studies 1 and 2 utilized an egocentric social network design where the participant (referred to as the “ego” in social network terminology) answered questions about the 30 closest people in their life (referred to as “alters”). These questions pertained to the demographic characteristics of each alter, such as age, race, and gender. Furthermore, there were questions about their relationship with each alter, such as is each alter a friend, family member, or co-worker. Also, the participants indicated how close he or she felt to each alter. Next, the participants answered questions about each alter’s gambling, drinking, and smoking habits, and how often they engaged in these behaviors with each alter. Each of these behaviors was assessed on a 6-point Likert frequency scale that included the following levels: (1) not in the past year, (2) less than once a month, (3) once a month, (4) once a week, (5) multiple times a week, and (6) daily.

The structural components of an ego’s network are based off of the presence or absence of a tie between alters. To obtain network structure indices, the participants indicated how close each alter felt to other alters. Closeness was assessed on a 5-point scale: (1) they have never met, (2) not close at all, (3) slightly close, (4) moderately close, and (5) very close. Closeness was dichotomized such that they have never met and not close at all indicated an absence of a tie and slightly, moderately, or very close indicated a presence of a tie between alters. Assessment was done on EgoNet (McCarty, 2004) and UCINET 6 (Borgatti, Everett, & Freeman, 2002) was used to analyze network structure.

Data analysis
Jonckheere-Tepstra (Jonckheere, 1954) tests were conducted to examine differences in alter gambling, smoking, and drinking and the joint behavior with the ego between the networks of NPGs and PGs. Furthermore, based on clinical importance, I dichotomized the substance using behaviors as less than once a month or once a month or more. Weinstock and colleagues (2007) found that in a sample of treatment seeking PGs, gambling once a month or more was associated with gambling problems. Mann Whitney U tests were used to examine differences in the dichotomized behaviors between the networks of PGs and NPGs.

Since the data were nested, hierarchical linear models were conducted. Hierarchical linear models take into account multiple observations by an individual. These models are able to conduct interactions between the gambling status of the focal individual and alters’ substance use. For example, I tested to see if the participant’s diagnostic status interacted with alter gambling, smoking, and drinking when predicting a structural component such as centrality. Alter gambling, smoking, and drinking were fixed effects. All non-dichotomized independent variables were grand mean centered and data were analyzed in SPSS 19.0.

Study 1 Results and Discussion

*Overall activity of alters*

The medians for alter gambling, smoking, and drinking in PGs’ networks were less than once a month (Mdn = 2; *less than once a month*) whereas the medians for the three behaviors in NPGs’ networks were not in the past year (Mdn = 1, *not in the past year*). Consequently, the gambling (*Z = 4.98, p < .001*), smoking (*Z = 2.80, p < .01*), and drinking (*Z = 3.42, p < .001*) frequency of PGs’ network members were significantly higher than NPGs’ network members.
As shown in Table 1, the frequency of gambling, smoking, and drinking were greater in the PGs’ networks compared to the NPGs’ networks.

Although the median frequency of alter gambling, smoking, and drinking with the ego were the same (Mdns = 1, not in the past year,) significant differences in alters’ frequency of gambling ($Z = 3.84, p < .001$), smoking ($Z = 4.42, p < .001$), and drinking ($Z = 3.74, p < .001$) with the ego between the networks of PGs and NPGs emerged. See Table 2 for frequencies of gambling, smoking, and drinking with ego.

Due to the low frequency of the behaviors, alter gambling, drinking, and smoking were dichotomized as either engaging in the behavior at least once a month or less than once a month. The PGs’ networks included more alters who gambled ($U = 202620, p < .001$), smoked ($U = 193560, p < .01$), and drank ($U = 191970, p < .01$) at least once a month. Furthermore, PGs gambled ($U = 196350, p < .001$), smoked ($U = 202470, p < .001$) and drank ($U = 192540, p < .01$) more often with alters in their networks at least once a month compared to NPGs.

*Friend substance use*

As predicted, PG’s networks were comprised of more friends who gambled ($U = 64856, p < .001$), smoked ($U = 62772, p = .001$), and drank ($U = 63254, p = .001$) at least once a month. Furthermore, PGs engaged in gambling ($U = 196350, p < .001$), smoking ($U = 202470, p < .001$) and drinking ($U = 192540, p < .01$) with alters in their networks at least once a month compared to NPGs.

*Structural social network characteristics*

The first two structural indices that were examined were network density and centrality. There were no significant differences in density between the networks of PGs’ (1.95, $SD = 0.77$) and NPGs’ (2.10, $SD = 1.00$; $t(38) = .54$). Regarding degree centrality, alter gambling ($t(39) =$
2.31, \( p < .05 \)) and drinking (\( t(34) = 2.137, \ p < .05 \)) predicted centrality while alter smoking trended on significance (\( t(35) = 1.88, \ p = .07 \)). Similarly, when using dichotomized behaviors (less than once a month vs. once a month or more), alter gambling (\( t(36) = 2.63, \ p < .05 \)) and drinking (\( t(36) = 2.258, \ p < .05 \)) predicted centrality but not alter smoking (\( t(35) = 1.404, \ p = .17 \)). Furthermore, no significant relationships were observed between ego gambling severity, and alter gambling, drinking or smoking (all \( t's \leq .84 \), all \( p's \geq .40 \)) when predicting degree centrality. Also, when the behaviors were dichotomized, no significant interactions emerged between ego gambling severity and alter gambling, drinking, or smoking (all \( t's \leq .37 \), all \( p's \geq .71 \)) when predicting centrality. These findings suggest that the structural components of NPGs’ and PGs’ networks are similar.

All participants felt subjectively closer to alters who gambled (\( F(1, 1179) = 31.27, \ p < .001 \)), smoked (\( F(1, 1195) = 6.32, \ p = .01 \)), and drank more frequently (\( F(1, 1192) = 6.43, \ p < .05 \)). There were no interactions between diagnostic severity and alters’ gambling (\( F(1, 1179) = 0.97, \ p = .32 \)) or smoking (\( F(1, 1195) = 1.02, \ p = .32 \)) in predicting closeness, although NPGs felt subjectively closer to the drinkers in their networks than PGs (\( F(1, 1192) = 6.49, \ p < .05 \)).

The final structural component that was examined was homophily. There was a positive correlation between an alter’s gambling score and the average gambling scores of the other alters to whom that alter was connected (\( r(977) = .61, \ p < .001 \)). This is indicative of homophily which states that people who are similar are more likely to be connected to each other. There was no evidence of differential homophily in the networks of PGs (\( r(438) =.60, \ p < .001 \)) compared with the NPGs group (\( r(539) =.61, \ p < .001; \ F(1, 951) = 1.77, \ p = .18 \)).
Study 2 Results and Discussion

*Overall activity of alters*

Although the medians were the same for both groups (Mdn= 1, *not in the past year*), there was a significant difference in alters’ frequency of gambling ($Z = 3.229, p = .001$); that is, alters in PPGs’ networks gambled more frequently than those in NPGs’ networks. The medians were the same for alter frequency of smoking (Mdns= 1, *not in the past year*). Furthermore, there was not a significant difference in the distribution of alter smoking ($Z = 1.630, p = .103$). Regarding alcohol, there was a greater median frequency of drinking in NPGs’ networks compared to PPGs’ networks (Mdn = 2, *less than once a month* and Mdn= 1, *not in the past year*, respectively) although this effect was not significant ($Z = - .811, p = .417$). Table 3 displays the distribution of alter gambling, smoking, and drinking by ego gambling pathology. See Table 4 for frequencies of gambling, smoking, and drinking with ego.

When examining the relationship between alter gambling, smoking, and drinking with the ego, consistent with the previous finding, alters in PPGs’ networks gambled more often with the ego than alters in NPGs’ networks (Mdns= 1, *not in the past year*; $Z = 4.45, p < .001$). Furthermore, compared to alters in NPGs’ networks, alters in PPGs’ networks smoked more often with the ego (Mdns= 1, *not in the past year*; $Z = 2.655 p < .01$). Lastly, alters in PPGs’ networks did not drink significantly more with the ego than alters in NPGs’ networks (Mdns= 1, *not in the past year*; $Z = .162, p = .871$).

Because of the low prevalence of all the behaviors in PPGs’ and NPGs’ networks, alter gambling, smoking, and drinking were dichotomized as either less than once a month and once a month or more. Consistent with the previous findings on alter gambling and alter gambling with ego, PPGs’ networks included more alters who gambled ($U = 2148000, p < .001$) and gambled
with the ego at least once a month ($U= 2203440, p < .001$). There were no significant differences in the number of alters who smoked ($U= 2275080, p = .262$), the number of alters who smoked with the ego ($U= 2275740, p = .103$), the number of alters who drank ($U= 2391390, p = .077$), and the number of alters who drank with the ego ($U= 2265390, p = .241$) at least once a month between the networks of PPG and NPGs.

Friend substance use

Friends in PPGs’ networks gambled ($U = 854744, p < .01$), gambled with the ego ($U = 851686, p = .001$), and smoked with the ego ($U = 883591, p < .05$) significantly more at least once a month than friends in NPGs’ networks. There were no significant differences in friends’ smoking ($U = 883604, p = .12$), drinking ($U = 925763, p = .66$), and drinking with the ego ($U = 905261, p = .73$).

Structural social network characteristics

Contrary to the results in Study 1, there were significant differences in network density between the networks of PPGs and NPGs ($U = 2738250, p < .001$). PGs’ networks were denser than NPGs’ networks.

When examining the relationship between alter gambling, drinking, and smoking and centrality, both alter gambling ($t(7010) = 7.357, p < .001$) and drinking ($t(7072) = 3.621, p < .001$) predicted centrality whereas alter smoking did not predict centrality ($t(6977) = .634, p = .53$). The interaction between alter gambling and diagnostic severity was not significant in predicting centrality ($F(1, 102)= .366, p = .546$). Neither was the interaction between alter smoking and diagnostic severity ($F(1, 110) = .095, p = .758$) and alter drinking and diagnostic severity ($F(1, 165) = .056, p = .813$).
When examining the relationship between alter gambling, drinking, and smoking and centrality, only alter gambling ($t(116) = 3.311, p < .001$) predicted centrality while alter drinking trended on significance ($t(150) = 1.78, p = .077$). Furthermore, alter smoking did not predict centrality ($t(123) = .276, p = .78$). Similarly, when the behaviors were dichotomized, alter gambling predicted degree centrality ($t(116) = 3.311, p < .001$). Alter smoking and drinking did not predict centrality (all $t$’s $\leq 1.4$, all $p$’s $\geq .17$).

The interaction between alter gambling, smoking, and drinking and diagnostic severity was not significant in predicting centrality (all $t$’s $\leq 1.04$, all $p$’s $\geq .30$). Furthermore, when the behaviors were dichotomized, no interactions were significant (all $t$’s $\leq .58$, all $p$’s $\geq .57$).

When examining the relationship between alter gambling, drinking, and smoking in predicting closeness and the interaction between these behaviors and gambling pathology, alter gambling ($t(7138) = 11.413, p < .001$), smoking ($t(7125) = 2.596, p < .01$), and drinking ($t(6989) = 6.595, p < .001$) predicted closeness. Furthermore, alter substance use did not interact with ego gambling pathology in predicting closeness. The interactions between alter gambling ($F(1, 150) = 1.029, p = .312$), smoking ($F(1, 168) = .252, p = .616$), and drinking ($F(1, 210) = 2.624, p = .107$) and ego pathology were not significant.

There was a significant effect of homophily when examining the combined networks of PGs and NPGs ($r(7080) = .293, p < .001$). Furthermore, homophily was significant when examining both PPGs’ and NPGs’ networks separately ($r(720) = .324, p < .001$ and $r(6360) = .283, p < .001$, respectively), although there was no evidence of differential homophily ($F(1, 188) = 2.398, p = .123$).
CHAPTER 3

GENERAL DISCUSSION

The current study investigated the relationship between an ego’s gambling pathology and the prevalence of substance use in his or her network. Furthermore, the current study examined whether the ego’s gambling pathology had an effect on the most central members substance use; that is, whether the most central members in a PG’s network engaged in more frequent substance use than those in a NPG’s network. The current study also sought to investigate the presence or absence of gambling homophily. There were mixed findings in network composition and structure between the two studies. In the adult sample, Study 1, differences emerged in network composition between the networks of PGs and NPGs whereas in the college sample, Study 2, there were differences in both composition and structure.

Consistent with my hypotheses, both studies indicated that alters gambled and gambled more frequently with the ego in PGs’ networks compared to NPGs’ networks. Similarly, even when gambling was dichotomized as either at least once a month or less than once a month, alters gambled more frequently in the networks of PGs. Consistent with these findings, in both studies, friends gambled and gambled significantly more frequently with the ego in PGs’ networks compared to NPGs. These results are consistent with the literature on drinking “buddies” (Leonard, Kearns, & Mudar, 2000); heavy drinkers report a significantly greater number of drinking buddies than regular drinkers (Leonard et al., 2000; Reifman et al., 2006). Peers reinforce the behavior of the ego which may result in deleterious consequences for both individuals.
Previously stated, both studies found that PGs’ networks were comprised of more gambling and gambling buddies. Regarding network density, in the college-aged sample, PGs’ networks were significantly denser than NPGs’ networks but in the adult sample, no differences in network density emerged. Although the two different studies are comprised of broadly different samples in terms of race and education, the results may suggest that college gamblers form tight knit groups mostly comprised of gamblers and gambling buddies but that over time, their close-knit network disseminates. This may be because one of the cardinal symptoms of PG is jeopardizing relationships with close others. This results in an effort by the PG to either form new relationships with other gamblers or to maintain their current relationships. Future research should utilize a longitudinal design to examine if PGs’ networks are stable over time.

In the adult sample, Study 1, the networks of PGs had a higher rate of comorbidity than the networks of NPGs, such that there was a greater prevalence of gambling, smoking, and drinking in PGs’ networks compared to NPGs’ networks. Furthermore, more network members gambled, smoked, and drank with the ego in PGs’ networks. These results are supportive of the findings on the co-occurrence of gambling with alcohol and tobacco use. Also, these results suggest that network members engage in multiple substance use with the ego, and although no evidence was provided on alter pathology; I posit that the network members are as pathological as the ego. In the college sample, Study 2, the social network of PPGs had a greater prevalence of gambling and alters who gambled with the ego in their networks. The difference between Studies 1 and 2 may stem from the different populations that were recruited. There is evidence that suggests that as individuals who develop gambling problems age, they spend less time with their non-gambling friends and spend more time with individuals who also engage in gambling (Shead, Derevensky, & Gupta, 2010). Since PG is highly comorbid with tobacco and alcohol
use, PGs may spend more time engaging in these behaviors with similar others over time resulting in greater levels of smoking, drinking, and gambling in older PGs’ networks. Although the populations are different in terms of demographics and education, this may explain the different findings between Studies 1 and 2.

In both studies, alter gambling and dichotomized alter gambling were associated with a high degree centrality in the respondent’s network. There is research with adolescents that suggest that individuals with high degree centrality tend to engage in frequent substance use (Ennett et al., 2006). In both studies, there was not a significant interaction between ego pathology and alter gambling in predicting degree centrality. Because every participant had to be a frequent gambler to participate in both studies, the lack of interaction may have arisen because of high occurrence of gambling in the network. Furthermore, the adult sample found that alter drinking and dichotomized alter drinking were associated with higher centrality scores. This may have arisen because of the high co-occurrence of PG with alcohol use. Surprisingly, centrality was not associated with tobacco use even though gambling and smoking are highly co-occurring. There is research that suggests that smokers tend to be isolates and tend to have fewer friends (Valente, Unger, & Johnson, 2005). Although there is a greater prevalence of smoking in PGs networks in the adult sample, these individuals tend to group towards the periphery of networks.

In both studies, alter gambling, smoking, and drinking predicted closeness. Furthermore, there was no interaction with ego pathology, suggesting that the increased levels of closeness were not driven by ego pathology. Overall, egos felt closer to alters who gambled, smoked, and drank. Egos may view people who engage in substance use as more fun or sociable, resulting in the ego perceiving them as closer.
Although there is evidence of homophily in the alcohol and tobacco literature (Rosenquist et al., 2010; Christakis & Fowler, 2008), this is the first study to find homophily in the gambling literature. In both studies, we found that gamblers tend to be more frequently and closely linked to other gamblers. Homophily may have arisen due to either social selection of influence. Social selection indicates that individuals select friends who are similar to themselves whereas social influence argues that members of an individual’s social network change the behaviors and beliefs of the focal individual. Nevertheless, the ego’s social network will reinforce his or her substance use resulting in greater substance use by the individual.

Limitations and Future Directions

One limitation that may have arisen out of the design of the current studies is the false consensus effect. The false consensus effect states that individuals tend to project their own beliefs and attitudes onto others (Ross, Greene, & House, 1977). Future research should utilize a sociocentric design in which information is gathered from every member of a network. Due to the cross-sectional nature of the design, the current study cannot differentiate between the role of social selection and influence. Future research should utilize a longitudinal design. Another limitation of both studies was the small sample sizes, especially regarding the PG group. Future research would benefit from a more diverse sample, consisting of a greater level of gambling severity.

Conclusions

The current studies found significant differences in the compositional and structural aspects of PGs’ and NPGs’ networks. Furthermore, both studies found homophily in gamblers’
social networks such that gamblers tended to be more connected to other individuals who
gambled. Also, alters who were central in ego’s networks tended to be similar to the ego. These
findings suggest that individuals build their social networks around individuals who they feel
closer to and are similar to themselves. These results are supportive of the idea that for a PG
seeking treatment, the individual must change his or her social network. The ego must create a
social network with members who do not engage in gambling or other substance use, so that the
individual does not feel tempted to engage in substance use. Furthermore, if the clinician is
treating a college-aged gambler, the therapist should recognize that college PG’s may be more
resistant to change because of their close-knit social network.
References


Table 1.

Study 1 distribution of alters’ overall gambling, smoking and drinking frequency by PG status.

All values are percentages. Total N’s are given in parentheses.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Gamble NPG</th>
<th>Gamble PG</th>
<th>Smoke NPG</th>
<th>Smoke PG</th>
<th>Drink NPG</th>
<th>Drink PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>11.06(73)</td>
<td>19.07(103)</td>
<td>27.73(183)</td>
<td>31.85(172)</td>
<td>11.82(78)</td>
<td>23.52(127)</td>
</tr>
<tr>
<td>Multiple times a week</td>
<td>8.33(55)</td>
<td>13.15(71)</td>
<td>6.67(44)</td>
<td>6.85(37)</td>
<td>16.36(108)</td>
<td>11.11(60)</td>
</tr>
<tr>
<td>Once a week</td>
<td>8.33(55)</td>
<td>10.56(57)</td>
<td>1.82(12)</td>
<td>4.26(23)</td>
<td>10(66)</td>
<td>10.19(55)</td>
</tr>
<tr>
<td>Once a month</td>
<td>7.27(48)</td>
<td>5.93(32)</td>
<td>2.58(17)</td>
<td>4.44(24)</td>
<td>5.76(38)</td>
<td>6.85(37)</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>7.42(49)</td>
<td>5(27)</td>
<td>3.64(24)</td>
<td>4.63(25)</td>
<td>7.42(49)</td>
<td>6.48(35)</td>
</tr>
<tr>
<td>Not in the past year</td>
<td>57.58(380)</td>
<td>46.3(250)</td>
<td>57.58(380)</td>
<td>47.06(259)</td>
<td>48.64(321)</td>
<td>41.85(226)</td>
</tr>
</tbody>
</table>
Table 2.

Study 1 distribution of alters’ gambling, smoking and drinking frequency with ego, by PG status. All values are percentages. Total N’s are given in parentheses.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Gamble with Ego</th>
<th>Smoke with Ego</th>
<th>Drink with Ego</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPG</td>
<td>PG</td>
<td>NPG</td>
</tr>
<tr>
<td>Daily</td>
<td>8.03 (53)</td>
<td>12.41 (67)</td>
<td>13.79 (91)</td>
</tr>
<tr>
<td>Multiple times a week</td>
<td>5.15 (34)</td>
<td>7.96 (43)</td>
<td>7.88 (52)</td>
</tr>
<tr>
<td>Once a week</td>
<td>5.61 (37)</td>
<td>9.63 (52)</td>
<td>2.88 (19)</td>
</tr>
<tr>
<td>Once a month</td>
<td>7.88 (52)</td>
<td>6.85 (37)</td>
<td>4.24 (28)</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>6.82 (45)</td>
<td>5.93 (32)</td>
<td>5.45 (36)</td>
</tr>
<tr>
<td>Not in the past year</td>
<td>66.52 (439)</td>
<td>57.22 (309)</td>
<td>65.76 (434)</td>
</tr>
</tbody>
</table>
Table 3.

Study 2 distribution of alters’ overall gambling, smoking and drinking frequency by PG status.

All values are percentages. Total N’s are given in parentheses.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Gamble</th>
<th>Smoke</th>
<th>Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPG</td>
<td>PPG</td>
<td>NPG</td>
</tr>
<tr>
<td>Daily</td>
<td>1.11(71)</td>
<td>1.167(12)</td>
<td>4.80 (308)</td>
</tr>
<tr>
<td>Multiple times a week</td>
<td>1.87(120)</td>
<td>2.78(20)</td>
<td>3.26 (209)</td>
</tr>
<tr>
<td>Once a week</td>
<td>2.91(187)</td>
<td>6.11(44)</td>
<td>3.69 (180)</td>
</tr>
<tr>
<td>Once a month</td>
<td>8.16(524)</td>
<td>10.56(76)</td>
<td>3.69 (237)</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>13.78(885)</td>
<td>14.97 (79)</td>
<td>4.24 (272)</td>
</tr>
<tr>
<td>Not in the past year</td>
<td>72.17</td>
<td>67.92</td>
<td>81.21</td>
</tr>
</tbody>
</table>

All values are percentages. Total N’s are given in parentheses.
Table 4.

Study 2 distribution of alters’ gambling, smoking and drinking frequency with ego, by PG status. All values are percentages. Total N’s are given in parentheses.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Gamble with ego</th>
<th>Smoke with ego</th>
<th>Drink with ego</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPG</td>
<td>PPG</td>
<td>NPG</td>
</tr>
<tr>
<td>Daily</td>
<td>0.84 (54)</td>
<td>0.83 (6)</td>
<td>1.03 (66)</td>
</tr>
<tr>
<td>Multiple times a week</td>
<td>0.76 (49)</td>
<td>0.97 (7)</td>
<td>1.07 (69)</td>
</tr>
<tr>
<td>Once a week</td>
<td>1.07 (69)</td>
<td>3.19 (23)</td>
<td>1.59 (102)</td>
</tr>
<tr>
<td>Once a month</td>
<td>3.77 (242)</td>
<td>6.11 (44)</td>
<td>2.27 (146)</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>10.44 (670)</td>
<td>12.07 (87)</td>
<td>3.75 (241)</td>
</tr>
<tr>
<td>Not in the past year</td>
<td>83.12 (5336)</td>
<td>76.81 (553)</td>
<td>90.28 (5726)</td>
</tr>
</tbody>
</table>
Graph 1.

Graphical representation of a PG’s network. Each node represents an alter in an ego’s network. The ego is not shown. Darker colors indicate greater frequency of gambling, smoking, and drinking.
Graph 2.

Graphical representation of a NPG’s network. Each node represents an alter in an ego’s network. The ego is not shown. Darker colors indicate greater frequencies of gambling, smoking, and drinking.