The Influence of Friends and Peers on Adolescent Substance Use: A Systematic Review

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Introduction

Adolescence is a time for youth to expand and explore who they are in the context of others. They tend to spend less time with family and more time with friends and peers. Consequently, friends and peers often increase an adolescent's tendency to participate in delinquent behavior, including experimentation with illicit substances (Azad et al., 2018; Balan et al.,2012). Given the social factors of substance use, many researchers have brought attention to how peers, friends, and other social factors influence the initiation of the use. The research on adolescent substance use factors is essential because many adolescents who experiment with substances continue the patterns into adulthood, developing dependence and abuse patterns (Ali et al., 2009; Balan et al., 2012; Barry et al., 2017; Burk et al., 2010; Rostosky & Stevens-Watkins, 2010). Because friends and peer relationships are influential in adolescence, many researchers have often measured the extent they have on an adolescent's experimentation and use of substances.

Multiple theories and perspectives can explain the connection between friends, peers, adolescents, and substance use. This review recognized fourteen influential perspectives and theories that were either the basis of the research or the reason for the results of the research. Three articles highlighted social learning theory as an important theory and the cause of their study. Social Learning Theory proposes that individuals learn their behaviors through observations and interactions with others in their surroundings (Azad et al., 2018; Balan et al., 2012; Wallace 2015). Social learning theory is an ideal theory because it explains why adolescents become influenced. Another relevant theory is the Differential Association Theory. Two articles used differential association theory as a major theory in their research and is like

social learning theory in saying that delinquent behavior and actions are learned (Azad et al., 2018; Rowan, 2016). The two theories are similar but social learning theory does not focus on delinquent behavior only. The delinquent behavior in this review is substance use.

I will use terms throughout the systematic review that need explanation. The first two terms relate to each other. *Selection* refers to the idea that adolescents tend to choose whom they hang out with based on similar interests; *socialization* is when a group of people (friends) change to become more similar to other members of the group (Burk et al. 2010). Many articles in this review base their findings on these two terms. Also, *perception* is the perceived [friend] use of substances (Wallace, 2015). *Peer network* and *network affiliation* refer to an adolescent's schoolmates and peers they do not hang out with specifically. For this study, I exclude close friends and best friends from peer networks but include the peers' siblings. *Substance use* refers to any or all the following: alcohol, cigarettes, and marijuana. *Prosocial* behavior refers to behavior that is absent of any deviant behavior or substance use. I interchange *deviant* and *delinquent* throughout the review. In this review, both terms refer to the person or action that leads to substance use.

The purpose of this systematic review is to study the connections between friends, peers, and adolescents. Additionally, the review will examine the effects the friends and peers have on adolescent substance use. The review is a survey of substance use tendencies of adolescents.

Methodology

The literature search process included the use of several search engines. The searching process included PsycINFO (2009-2019), EBSCOhost (2009-2019), JSTOR (2009-2019), and Google Scholar (2009-2019). The keywords I searched were as follows: "friends" OR "peers," AND "substance use," AND "adolescents" OR "adolescence." For items not immediately

available, some articles came through interlibrary loans via EBSCOhost. I considered reference lists of retrieved articles as a new searching process.

The review includes studies with adolescents, ages eleven through seventeen. Also, the review includes peer network influences and close friend influences on substance use. Several articles divided substance use between substance experimentation and frequent use; I included the articles that split substance use in the review. I wanted an overview of possible extraneous variables. I also included articles covering gender, race, popularity (as defined in Burk et al., 2016), time, deviancy, perception, susceptibility or influence, and context. The search terms were not limited to solely friends and peers to include an overview of the contextual factors

While I obtained several articles through interlibrary loans, many articles were excluded for the same reason, especially if the articles' abstracts only mentioned friend relationships but did not study them. I also excluded articles that included parent influences on adolescent substance use unless the parental influences affected peer influences.
Furthermore, while some chosen studies mentioned romantic partners, I did not make them a separate attribute from peers. I excluded articles that studied substances other than alcohol, cigarettes, and marijuana. For this review, I only chose to review alcohol, cigarettes, and marijuana because they are the most popular and well known, and thus tend to be more socially influential on adolescents (Campbell et al.,2015). Further, many studies combined the three in some way.

In Appendix A, the readers will find the annotated bibliography, which has descriptions of the fifteen articles chosen for this review.

Results

The initial search found 170 titles. I took into consideration 33 articles. After reflection, 15 articles include all aspects of the systematic review. The articles that were taken out, eighteen, were too broad and did not have enough focus on friendships or peers. Out of the fifteen articles, two articles were for definitions, clarification, and subjective purposes only. The remaining thirteen used measurable data to compare the effects friends and peers had on substance use in adolescents.

The were conducted in America, China, Finland, Sweden, and the Netherlands. There were no clinical settings used in the measured data; however, in Azad et al.'s (2009) article, interviews took place in private rooms provided by the juveniles' social workers or rooms in the library. Three articles, however, were conducted in classroom settings. Sample sizes varied by article, ranging from 9 participants to around 90,000. For ethical reasons, the studies are causal-comparative. Researchers looked at scales and surveys to conduct their studies.

The most common scale used in the articles was the National Longitudinal Survey of Adolescent Health (AddHealth). This scale originated in 1994 and had around 90,000 participants from across the United States throughout three waves. The survey spanned across almost a decade. In this review, six articles used data gathered from this survey. One article used the National Survey on Drug Use and Health, while another used the Adolescent Health Risk Behavior Survey. From these articles, the authors used smaller scales for the sections of their chosen survey that aligned with their study. The two articles that I used for subjective and non-measurable purposes used Consensual Qualitative Research through interviewing and the Social-Spatial Adolescent Survey, respectively. The remaining three articles conducted surveys and

questionnaires in person; that is, they delivered the information to the adolescents and did not use preexisting data.

Table 1

Effects of Peer Network Influence on Substance Use

References	Sample Characteristics	Network Affiliation Type	Substance	Effects
Allen, J. P., Chango, J., Martson, E., Schad, M., & Szwedo, D. (2012)	157 adolescents (*M*=13.35 years)	Close friend	Alcohol and marijuana	AD are most susceptible to engage in SU if close friend who uses is well liked.
Ali, M. M. & Dwyer, D. S. (2009	20,745 adolescents (*M*=15.15 years)	Close friends and school peers	Cigarettes	Having 25% of close friends who smoke raises an AD's chance to smoke by 5%; if 25% of school-age peers smoke, an AD's chance of smoking raises to 10%
Balan, S., Chen, H., & Price, R. K. (2012)	46,675 adolescents	School Peers	Alcohol and illicit drugs (marijuana)	Being friends with delinquent peers is linked to binge drinking and marijuana use in White, Native American and Mixed-race AD
Barry, A. E., Merianos, A. L., Montgomery, L., Rosen, B. L., & Smith, M. L. (2017)	937 adolescents	Close friends	Alcohol and marijuana	AD with high friend approval and behavior of alcohol and marijuana use had a higher chance of lifetime alcohol and marijuana use.
Burk, W. J., Cillessen, A. H. N., Scheres, A., & de Water, E. (2016)	172 adolescents in the Netherlands (*M*=15.22 years)	Best friend and popular classmates	Alcohol, cigarettes, and marijuana	Best friends were similar in their alcohol and tobacco use; popular friends risk-taking preferences is linked to alcohol use in less popular friends; decision making of popular friends not associated with tobacco and marijuana use of less popular friend
Burk, W. J., Kiuru, N., Laursen, B., Nurmi, J., & Salmela-Aro, K. (2010)	1,419 Finnish secondary students from 9 schools (*M*=16.36 years)	Same-grade schoolmates	Alcohol and cigarettes	AD who smoke look for friends who smoke. AD who drink will search for like-minded people and be influenced by peers' drinking behaviors.
Chernyavskiy, P., Deutsch, A. R., Steinley, D., & Slutske, W. S. (2014)	1,192 adolescents (*M*=15.71 years)	Friends	Alcohol, cigarettes, and marijuana	Actual friend use is related to marijuana use one year later; Perceived friends use related to alcohol and cigarette initiation; friendship quality affected perception of marijuana use one year later; the more time AD spends with friends, the more likely they'll use cigarettes
Dorn, L. D., Marklein, E., & Negriff, S. (2009)	264 adolescent females (*M*=14.9 years)	Best Friend	Alcohol, cigarettes, and marijuana	Females whose friends smoke cigarettes regularly increases the likelihood of cigarette, alcohol, and marijuana use; variations in SU are caused mainly through close friends that smoke.
Feng, Y., French, D. C., Jin, S., Li, L., Lu, T., & Niu, L. (2017)	1,729 Chinese adolescents in middle and high school (*M*=13.3 years and *M*=16.6 years respectively)	Mutual Best Friends	Cigarettes	Chinese males' tobacco use was strongly associated with that of his friends; they became friends with those that resembled them in levels of tobacco use.
McGloin, J., M., Sullivan, C. J., & Thomas, K. J. (2014)	Approximately 8,000 adolescents	Friends and same-grade school peers	Alcohol and cigarettes	AD without highly dense of friend groups (dissimilarity) less influential than schoolmates.
Rostosky, S. & Stevens-Watkins, D. (2010)	1,599 adolescents (*M*=16 years)	Best friends	Alcohol	Perceived close friend SU in AD was a protective factor in later binge drinking.
Rowan, Z. R. (2016)	182 black adolescent dyads and 657 white adolescent dyads (*M*=14.9 years)	Siblings and best friends	Alcohol and cigarettes	Sibling SU, instead of best friend use, had a significant effect on black and white adolescents' alcohol and cigarette use.
Wallace, L. N. (2015)	753 non-twin adolescent sibling pairs, split into older and younger sibling pairs (*M*=15.5 and 17.5 years, respectively)	Female and male friends and siblings	Alcohol, cigarettes, and marijuana	Older siblings' number of friends had significant effects on younger sibling's involvement with marijuana only. Alcohol and cigarette involvement and sibling's number of friends had no significant interactions.

Note: Allen et al.'s article and Campbell et al.'s article is not use in the table for lack of measurable data. Key: AD – adolescent(s) SU – substance use

Results from the review are shown in Table 1. Many of the studies delivered conflicting results. Overall, adolescents had an influence on the likelihood of another adolescent using a substance.

Close Friends and Best Friends

Close friends or best friends often determined whether adolescents would engage in user activity. Often, when younger adolescents observed or had contact with their friends, they were more likely to engage in the activity even one year later (Allen et al., 2012; Balan et al., 2012; Dorn et al., 2009; Feng et al., 2017; Rowan, 2016). Also, close friend use predicted lifetime use of alcohol, cigarette, and marijuana (Ali et al., 2009; Barry et al., 2017).

Friends did not even need to physically use substances to influence adolescents. Several studies found that perceived friend and peer use led to more adolescents using that substance (Barry et al., 2017; Chernyavskiy et al., 2014;). Cigarettes and marijuana were more influenced by the perception of use than alcohol, though perception and actual use of alcohol were close to significance ($p = .167$). (Chernyavskiy et al., 2014).

It is unclear, though, how influential friends and peers are. Some studies find that adolescents select peers who are similar in behavior to become friends with, while others find that friend groups influence each other to participate in deviant behavior through socialization. The drugs can influence it as well. Burk et al. (2010) found that adolescents who already smoke [cigarettes] are more likely to choose friends who smoke, while adolescents will use selection and socialization in the case of alcohol.

Peers

The findings on peers varied throughout the review. A few reviews found that school-peers influenced an adolescent's decision to use substances more than friends (McGloin et al., 2014;). When friendship groups are denser and thus more dissimilar, school peers have a more

significant impact on adolescent alcohol use (McGloin et al., 2014) However in the same study, McGloin et al. found little significance between peer and friend use on adolescent cigarette use (2014).

Popularity was a factor in an adolescent's decision in a few studies (Allen et al., 2012; Burk et al., 2016). Popularity, or the ability to be liked by an individual's friends and others, influenced adolescents' decisions. Furthermore, if popular peers use substances or are perceived to use substances, the less popular friends and adolescents are more likely to use substances, especially alcohol.

Siblings

Perhaps the most interesting discovery was the influence of siblings on adolescent substance use. They were more influential than any other type of relationship with adolescents. As a reminder, I included siblings with peers. Siblings played a vital role in influencing the use of substances. Siblings were a strong risk factor for future alcohol and cigarette use in Black and white adolescents (p = .00615 and p = .0067) *(*Rowan, 2016). Older siblings had more of an effect on younger siblings, especially if they had more friends (p = .02206; Wallace, 2015). Siblings had a stronger influence on adolescent use; however, it is unclear whether that influence carries into adulthood.

Discussion

This systematic review aimed to compare the effects friend and peer relationships had on adolescents using substances. Fifteen studies were in the final review. Thirteen sources used measurable data from 2009 to 2018.

Strengths

This review provides an overview of the different factors at play involving peer and adolescent substance use. The research uses similar data to form suggestions. Additionally, the research included quantitative as well as qualitative studies that effectively shared well-rounded explanations and information about adolescent substance use influences. Many articles encouraged the need for prosocial friends to influence positive behavior. Azad et al.'s study showed that even delinquents have a desire to have positive friends affect them and change them into better people (2009). The articles are a great way to show the variety of factors peers and friends take part in to influence the behavior and actions of adolescents, especially regarding substance use.

Limitations

Possibly, this review did not consider all studies during the search process. The specificity of "best friends" and the broadness of "peers" make the searches focused on one type of adolescent (e.g., race or gender). Many chosen studies had other aspects involved in the research, like adult influences and academic performance. I hoped the studies only would focus on peers and friends, but that was not the case many times.

The articles chosen were all written in the last ten years; however, six studies used the AddHealth survey. The first wave of the AddHealth survey is over 20 years old. The data, therefore, is likely outdated, and peers and friends might have different degrees of influence now. The studies used outdated materials collectively excluding Azad et al.'s qualitative research and the three articles that conducted surveys and questionnaires in person. It is clear from this review that more updated causal-comparative studies are needed to enhance this study further.

More qualitative surveys, too, can help close a gap on why peers and friends influence adolescents.

Implications

High school counselors can still use this information to draw broad conclusions on their student body. They can see if they recognize any patterns in adolescents' substance use and their peers and friends. Additionally, they can use the information to conduct a more particularized needs assessment to determine what kinds of interventions are needed. The articles provide some examples of prevention, peer group, friend group, and sibling counseling interventions that can be useful. Further research is needed to assess the effectiveness of any of the suggested interventions.

Conclusion

Since friends and peers have influenced the type, amount, and frequency of substance use in adolescents, the call for evidence-based intervention research is imminent. When schools consider the type of peer or friend that influences their student body the most, they can begin to research and implement interventions best suited for the school. While the research is not sufficiently in-depth, and one cannot ignore the limitations cannot, each article in the reviews poses a sense of need for adolescent beneficence in schools and communities.

References

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Ali, M. M. & Dwyer, D. S. (2009). Estimating effects in adolescent smoking behavior: A longitudinal analysis. *Journal of Adolescent Health, 45*(1), 402-408. 10.1016/j.jadohealth.2009.02.004.

Azad, A., Hau, H. G., & Kalrsson, M. (2018). Adolescent female offenders' subjective experiences of how peers influence norm-breaking behavior. *Child and Adolescent Social Work Journal, 35*(3), 257-270. doi: 10.1007/s10560-017-0526-0

Balan, S., Chen, H., & Price, R. K. (2012). Association of contextual factors with drug use and binge drinking about white, Native American, and mixed-race adolescents in the general population. *Journal of Youth and Adolescence, 41*(11), 1426-1441. doi: 10.1007/s10964-012-9789-0

Barry, A. E., Merianos, A. L., Montgomery, L., Rosen, B. L., & Smith, M. L. (2017). Impact of perceived risk and friend influence on alcohol, and marijuana use among students. *The Journal of School Nursing, 33*(6), 446-455. doi: 10.1177/1059840517717591

Burk, W. J., Cillessen, A. H. N., Scheres, A., & Water. E. (2016). Substance use and decision making in adolescent best friendship dyads: The role of popularity. *Social Development, 26*(4), 860-875. doi: 10.1111/sode.12227.

Burk, W. J., Kiuru, N., Laursen, B., Nurmi, J., & Salmela-Aro, K. (2010). Pressure to drink but not to smoke: Disentangling selection and socialization in adolescent peer networks and

peer groups. *Journal of Adolescence, 33*(6), 801-812. doi: 10.1016/j.adolescence.2010.07.006

Campbell, L., Crewe, S., Flay, B., Light, J., Mason, M., McHenry, C., Mennis, J., …, & Westling, E. (2015). Young adolescents perceived activity space risk, peer networks, and substance use. *Health &Place, 34*(1), 143-149. doi: 10.1016/j.healthplace.2015.04.005

Chernyavskiy, P., Deutsch, A. R., Slutske, W. S., & Steinley, D. (2014). Measuring peer socialization for adolescent substance: A comparison of perceived and actual friends' substance use effects. *Journal and Studies on Alcohol and Drugs, 76*(2), 267-277. doi: 10.15288/jsad.2015.76.267

Dorn, L. D., Marklein, E., & Negriff, S. (2009). Pubertal timing, friend smoking, and substance use in adolescent girls. *Prevention Science, 10*(2), 141-150. doi: 10.1007/s11121-008-0120-y.

Feng, Y., French, D. C., Jin, S., Li, L., Lu, T., & Niu,. L. (2017). Tobacco use by middle and high school Chinese adolescents and their friends. *Journal of Youth & Adolescence, 46(6), 1262-1274. doi: 10.1007/s10964-016-0563-6.*

McGloin, J. M., Sullivan, C. J., & Thomas, K. J. (2014). Peer influence and context: The interdependence of friendship groups, schoolmates, and network density in predicting substance use. *Journal of Youth & Adolescence, 43(9), 1436-1452. doi: 10.1007/s10964-014-0126-7.*

Rostosky, S. & Stevens-Watkins, D. (2010). Binge drinking, gender, ethnicity: Binge drinking in African American males from adolescence to young adulthood: The protective influence of religiosity, family connectedness, and close friends' substance use. *Substance Use and Misuse, 45*(10), 1435-1451. doi: 10.3109/10826081003754765.

Rowan, Z. R. (2016). Social risk factors of black and white adolescents' substance use: The differential role of siblings and best friends. *Journal of Youth & Adolescence, 45(7), 1482-1496. doi: 10.1007/s10964-016-0473-7.*

Wallace, L. N. (2015). Sibling popularity: A moderator of sibling influence for adolescent substance use. *Addiction and Research Theory, 23*(6), 481-489. doi: 10.3109/16066359.2015.1036046.

Appendix A

Allen, J. P., Chango, J., Marston, E., Schad, M., & Szwedo, D. (2012). Predictors of susceptibility to peer influence regarding substance use in adolescence. *Child Development, 83*(1), 337-350. doi: 10.1111/j.1467-8624.2011.01682.x

The purpose of this study was to assess the susceptibility of adhering to negative peer pressure. 157 adolescents were used for this study. The adolescents were asked to name their closest friend and answer self-report questions. The results of their study predicted that close friend's susceptibility was the biggest factor in adolescent substance use. The authors also suggest that when adolescents come from a week family base, they are less capable of handling peer pressure situations. In contrast, strong maternal relationships help teens not build substance use consistent with their friends. Well liked teens are also more likely to use substances consistent with their close friends. These findings, along with a few others in the study, give me a look at not just the kinds of pressure adolescents face, but what kinds of adolescents are more likely to be susceptible to pressure.

Ali, M. M. & Dwyer, D. S. (2009). Estimating effects in adolescent smoking behavior: A longitudinal analysis. *Journal of Adolescent Health, 45*(1), 402-408. 10.1016/j.jadohealth.2009.02.004.

The researchers in this study sought to define the role peer networks have an adolescent smoking they used data from the national longitudinal study of adolescent health and no subset. They used an empirical model to control effect size and biases. The influence of close friends from adolescent years continue to have an impact on smoking

in adulthood. Social influences is significant when determining the effects of addictive behaviors.

Azad, A., Hau, H. G., & Kalrsson, M. (2018). Adolescent female offenders' subjective experiences of how peers influence norm-breaking behavior. *Child and Adolescent Social Work Journal, 35*(3), 257-270. doi: 10.1007/s10560-017-0526-0

The purpose of this study was to gain perspectives on the role of friendships in delinquent behavior. The qualitative study consisted of 9 females convicted of a crime and sentenced to youth service – defined by unpaid work and an advocacy program intended as a rehabilitation penalty – in Sweden. Results from the study indicated 5 major themes involving peers: peers are a part of life, committing crime aided in peer socialization, the creation (and exploitation) of pressures and delinquent norms, offend and being offended by different delinquent contexts, and being aware of the importance of pro-social peers. The authors found that adolescent females have an awareness of the role peers play in their delinquent behavior. The article gave me insight on the influence of peers. I appreciated the direct look on how peers influence behavior and the feelings about said behavior from friends.

Balan, S., Chen, H., & Price, R. K. (2012). Association of contextual factors with drug use and binge drinking about white, Native American, and mixed-race adolescents in the general population. *Journal of Youth and Adolescence, 41*(11), 1426-1441. doi: 10.1007/s10964-012-9789-0

Social bonding theory is the idea that adolescents with strong connections with institutions, people, activities, and social norms are less likely to use substances. The authors compared social bonding theory with substance use and predicted a negative

trend. The authors also looked at Native Americans and mixed-race adolescents and questioned possible relationships as well. The researchers used data from the National Survey of Drug Use and Health. Native Americans binge drink more than white and mixed-race adolescents. Both Native Americans and mixed-race adolescents use more illicit drugs than their white counterparts and the differences were statistically significant. Peer risk factors between the 3 were similar but not significant. This study helps me get a broader idea of multiracial friendship influences, even though the language in this article was hard to understand.

Barry, A. E., Merianos, A. L., Montgomery, L., Rosen, B. L., & Smith, M. L. (2017). Impact of perceived risk and friend influence on alcohol, and marijuana use among students. *The Journal of School Nursing, 33*(6), 446-455. doi: 10.1177/1059840517717591

The researchers in this article wanted to find correlations between perceived risk of alcohol and marijuana use and lifetime alcohol or lifetime alcohol and marijuana use. The sample consisted of 937 students from 7th to 12th grade from Indiana. Results indicated that significant predictors of lifetime alcohol use were perceived risk of alcohol use, perceived friend approval of alcohol use, perceived friend behavior of alcohol use, and perceived friend illicit drug use ($p < .001$ and $p = .003$). Grade level, school type, perceived risk of marijuana use, perceived friend approval of marijuana use, and perceived friend academic performance were significant predictors of lifetime alcohol and marijuana use ($p = .02$, $p = .001$, & $p = .04$). Overall, predictors for lifetime alcohol use were from students with a low perceived alcohol risk and high perceived friend approval and behavior of alcohol use. Perception was the main predictor in lifetime alcohol or alcohol and marijuana use. This article helped me realize that perception

according to friend groups can have just as much as an impact as friends influence. The ordinal type II scales were effectively compared.

Burk, W. J., Cillessen, A. H. N., Scheres, A., & Water. E. (2016). Substance use and decision making in adolescent best friendship dyads: The role of popularity. *Social Development, 26*(4), 860-875. doi: 10.1111/sode.12227.

In this study, 172 participants were surveyed on their substance use in reference to their best friend's substance use. The study included how different types of best friends influence decisions like risk taking and immediate rewards. Best friends were similar in their alcohol ($p < .001$) and tobacco use ($p = .01$) as well as the risk-taking preferences ($p = .028$). Stronger risk-taking preferences was associated with more substance use and more friend substance use for both popular and less popular friends. More popular friends were able to convince the less popular friends to take more alcohol risks. This article is the first of the ones I've read that considers popularity and risk-taking behaviors. The sample size should grow if they try to replicate this study, however.

Burk, W. J., Kiuru, N., Laursen, B., Nurmi, J., & Salmela-Aro, K. (2010). Pressure to drink but not to smoke: Disentangling selection and socialization in adolescent peer networks and peer groups. *Journal of Adolescence, 33*(6), 801-812. doi: 10.1016/j.adolescence.2010.07.006

The main purpose of this study was to examine the peer selection and socialization in reference to alcohol and tobacco use. The authors surveyed 1,419 Finnish adolescents on their tobacco use, alcohol use, and peer nominations. Peer selection is effective in reference to tobacco use. Peer selection and socialization is at work with alcohol use; peers select others with similar drinking styles, and they adapt drinking

styles of their peers. This article was helpful in focusing on selection and socialization while many articles just acknowledge the existence and continue. This article helped defined the 2 terms so I can understand my other articles better.

Campbell, L., Crewe, S., Flay, B., Light, J., Mason, M., McHenry, C., Mennis, J., …, & Westling, E. (2015). Young adolescents perceived activity space risk, peer networks, and substance use. *Health &Place, 34*(1), 143-149. doi: 10.1016/j.healthplace.2015.04.005

The article compares perceived activity space risk (substance use risk at a location) and substance use among urban youth. The authors use peer networks to relate the 2 variables. They used baseline data from the Social-Spatial Adolescent Study and found 250 adolescents, ages 13 to 14, and asked them to rate substance use involvement and likelihood of substance use at certain locations. Participants were then asked to describe peer network information. The results indicated that alcohol use was likely consumed in friends' homes and tobacco and marijuana use were likely used at parks or outdoors. Activity space risk significantly predicted substance use for all three substances use. This article helped me understand environmental factors that affect substance use in adolescents.

Chernyavskiy, P., Deutsch, A. R., Slutske, W. S., & Steinley, D. (2014). Measuring peer socialization for adolescent substance: A comparison of perceived and actual friends' substance use effects. *Journal and Studies on Alcohol and Drugs, 76*(2), 267-277. doi: 10.15288/jsad.2015.76.267

The authors used the National Longitudinal Survey of Adolescent Health (AddHealth) to compare the effects of perceived friend use (PFU) and actual friend use(AFU). The sample size was 1,192 adolescents. The effect sizes were constrained to

be equal. The 2 effects are not significantly different in magnitude. PFU tend to overestimate and bias direct effect, but AFU and PFU effects are inherently similar. The effect sizes overlapped in all but 2 areas. PFU effects of cigarette and marijuana initiation. AFU for cigarette initiation was stronger when friends are closer and less close with marijuana use. This article gave me clear information on the relationship between perception and substance use. The authors announce the potential PFU bias that can overestimate the magnitude of effects in this and all similar studies; admitting bias is professional. This article was one of my favorites to read.

Dorn, L. D., Marklein, E., & Negriff, S. (2009). Pubertal timing, friend smoking, and substance use in adolescent girls. *Prevention Science, 10*(2), 141-150. doi: 10.1007/s11121-008-0120-y.

This study had 3 hypotheses regarding adolescent substance use: early pubertal timing with have an increased effect on alcohol, cigarette, and marijuana use, friends who smoke influence an individual's use on all 3 as well, and pubertal timing will interact with the effects of friends who smoke. Participants were 264 female adolescents and they were given interviews questions and provided self-reports of friend substance use. Results found that late pubertal timing had an increased effect on alcohol use only, opposite of the first hypothesis. Having friends who smoke increases an individual's likelihood of using alcohol, cigarette, and marijuana. The results disproved the 3rd hypothesis, explaining that friend smoking gave more variation in alcohol use than pubertal timing. This study uses Caucasian and African American girls, a broad range of ages, and accounts for urban, suburban, and rural communities. The diversity in the study is excellent while providing relevant information to my topic.

Feng, Y., French, D. C., Jin, S., Li, L., Lu, T., & Niu,. L. (2017). Tobacco use by middle and high school Chinese adolescents and their friends. *Journal of Youth & Adolescence, 46(6), 1262-1274. doi: 10.1007/s10964-016-0563-6.*

Feng and her advisors studied possible relations of tobacco use and Chinese friends. They're sample was from 2 middle schools and 3 high schools. Middle school sample sizes ranged from 614, 764, and 748. High school sample numbers ranged from 567, 783, and 662. Each participant named up to 5 friends and rated their tobacco use by frequency. The results indicated that boy's tobacco use was significantly and positively correlated with their friends use in both middle and high school. In contrast, the correlations were not as significant for females and four of the 6 grades. Male smoking predicted future friend use, but it was not the same switched. This article is an excellent culture peace. I noticed no biases, the information is relevant, and language is easy to follow.

McGloin, J. M., Sullivan, C. J., & Thomas, K. J. (2014). Peer influence and context: The interdependence of friendship groups, schoolmates, and network density in predicting substance use. *Journal of Youth & Adolescence, 43(9), 1436-1452. doi: 10.1007/s10964-014-0126-7.*

The study aimed to explain a relationship between schoolmates and adolescent behavior, particularly substance use, comparing an schoolmates, friendship group density, and likeliness of substance use. The authors used data from the National Longitudinal Survey of Adolescent Health (AddHeath) and chose approximately 8,000 participants. The adolescents were asked to rate items on scales. Results from the study indicated that friendship groups are not always a factor in predicting substance use

because of friendship density (the number of friends and individual has in their friend group). If the attitudes of the friend group are not like those of their schoolmates, then an adolescent has a higher chance of using substances unless his or her friend group is highly dense. This was one of the articles I was most excited about and while it provides relevant and significant information, it is confusing. The statistical numbers do not make sense. However, as I've mentioned the article had relevant information about my topic that I can use.

Rostosky, S. & Stevens-Watkins, D. (2010). Binge drinking, gender, ethnicity: Binge drinking in African American males from adolescence to young adulthood: The protective influence of religiosity, family connectedness, and close friends' substance use. *Substance Use and Misuse, 45*(10), 1435-1451. doi: 10.3109/10826081003754765.

The purpose of the study was to determine if certain factors predicted binge drinking in African American adolescents and if those factors are applicable in young adulthood. 1,599 African American males were in this study, chosen from the National Longitudinal Survey for Adolescent Health (AddHealth). The authors found that religiosity, family influence, and low perceptions of close friends' substance use resulted in low binge drinking (all $p < .001$). In young adulthood, high perceptions of close friends' substance use with the only factor that brought high levels of binge drinking, with the effect greater if the perceptions started in early adolescence. This article addresses the perception of use instead of influence on use. Perception is a key factor in adolescent substance use; the study supports other findings on perception in this bibliography.

Rowan, Z. R. (2016). Social risk factors of black and white adolescents' substance use: The differential role of siblings and best friends. *Journal of Youth & Adolescence, 45(7), 1482-1496. doi: 10.1007/s10964-016-0473-7.*

In this article, Rowan analyzed risk factors for black adolescents' substance use compared to white adolescents. He used peers as factors; his definition included friends as well as siblings. Data was collected from the National Longitudinal Study of Adolescent to Adult Health (AddHealth). The study included 182 black dyads and 651 white dyads for drinking and 182 black dyads and 657 white dyads for smoking. Dyads consisted of best friends or siblings. Individual were then asked to rank sibling versus friend substance use. Rowan found that sibling substance use had an effect for black and white adolescents on alcohol and cigarette use as well as heavier cigarette use. Best friends do influence white adolescents more than black adolescents; however, sibling still have a bigger effect in white substance use than best friends ($p < .001$). Rowan included siblings as peers instead of an extraneous variable, and I will consider this for my study as well.

Wallace, L. N. (2015). Sibling popularity: A moderator of sibling influence for adolescent substance use. *Addiction and Research Theory, 23*(6), 481-489. doi: 10.3109/16066359.2015.1036046.

The purpose of this study was to find out which siblings were influential on younger siblings' substance use. In particular, she wanted to know if popular older siblings had a higher effect on the younger siblings' use of alcohol, cigarettes, and marijuana. Alcohol and cigarette use in younger siblings positively correlated with older sibling use, but friendships were not a factor. For marijuana use, however, older siblings

with more friends increased the likelihood of younger siblings use. “Older siblings are more influential [for marijuana use] when they are more popular” (Wallace 2015). This article appealed to me because families and siblings are an extraneous variable in my research topic. Programmatically preparing for this variable further solidifies my review. The article is within the last 5 years, so the study this recent.