

Methylphenidate Consumption Behaviors among Students of Ardabil University of Medical Sciences, 2017

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Abstract

Introduction: Methylphenidate is a derivative of the amphetamines group, which is prescribed to improve efficacy, reduce sleep, develop euphoria and treat depression. It also serves as an enhancement of memory and facilitates learning by students during examinations. The aim of this study was to investigate the Methylphenidate consumption behaviors among students of Ardabil University of Medical Sciences, 2017. **Methods:** This is a cross-sectional descriptive study that has been done on 150 university students who selected randomly from all medical fields. Data collected by a questionnaire included demographic data and questions about behavior and motivation of Methylphenidate abuse. Collected data analyzed by statistical methods in SPSS version 16. **Results:** Of all students, 52.6% were female and rest of them was male with mean age of 22.2±6 years. Of all students, 38 (25.3%) had Methylphenidate abuse. Most and least abuse of Methylphenidate was among dentistry and hygiene students with 72.7% and 5%. In terms of Methylphenidate consumers, impairment in thinking and memory with 81.6% and increasing the self confidence with 63.2% was the least and most motivation for Methylphenidate abuse. 65.8% of them, known the consumers as people with high self confidence and 39.5% known them inexpert people. **Conclusion:** Results showed that Use of non-prescriptive stimulant drugs among students specially males were prevalent and is considered as a high-risk behavior that should be monitored and controlled in the future with the necessary planning.

Keywords: Ardabil, Methylphenidate Abuse, Students, Consumption Behaviors

1. Introduction

Methylphenidate or Methylphenidate is derivatives of the amphetamines group. It is used to treat narcolepsy, brain damage, depression and to reduce behavioral disorders such as hyperactivity disorder and attention deficit in children^{1,2}. This drug exert its stimulating effect by increasing the release of dopamine from the granular reservoirs of the neural terminals and also by inhibiting the open absorption of dopamine and depending on its fast performance, its symptoms due to use appear quickly³. Despite the methylphenidate treatment effects,

there are many reports of its abuse. Methylphenidate arbitrary use at high dose is associated with an increasing risk of drug addiction and physical complications such as cardiovascular disease, headache, hypertension and psychological complications such as aggression, fear and anxiety and in worse cases associated with suicidal tendencies or kill other people⁴. Studies show that the popularity of Methylphenidate has increased among students over the recent years and most students use this drug to improve their academic performance, improve concentration and own learning. In a study in California at 2006, results showed that 11.2% of students used

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Methylphenidate in the past year and 4% in past 30 day⁵. Risky behavior is a particular form of behavior that is associated with increased sensitivity to a particular disease or a hazard for health⁶. According to the organization for the monitoring of youth behavior reports in America, Tobacco, opium and high-risk sexual behaviors that lead to sexually transmitted infections cause to hazard for health that may be associated with illness or death^{7,8}. Use of opium, alcohol and high-risk sexual behaviors is responsible for 13% disability in 13-15 year old people⁹. Identifying high risk subgroups provide an opportunity for health service providers and policy makers to identify people who have the same characteristics based on risky behavior patterns. Although researchers are investigating the risk factors and Methylphenidate abuse among students, but there are many questions about the factors affecting use of Methylphenidate, ways of reducing consumption, changing the behavior of the consumer and increasing the protective ways. In research about the prevention of drug abuse, it is important to know the cognitive factors such as knowledge, attitude, tendencies and behavioral intention of individuals¹⁰. The aim of this study was to investigate Methylphenidate consumption among students of Ardabil University of Medical Sciences.

2. Methods

This study was a descriptive cross-sectional study that has been done on different fields of Ardabil University of Medical Sciences in 2017. By estimation the necessary parameters in 95% CI and power 80%, the estimated sample size was 150 students which selected randomly from all university students and then answered our questionnaire. We used a research-based questionnaire included questions about attitude, behavioral tendencies, behavioral intent and motivation of the respondents as well as demographic information including field, gender, educational level, age, residence place, marital status and history of smoking, alcohol, drugs and psychotropic drugs use which designed by Ataei and et al based Prototype/Willingness Model (PWM)¹¹. All students complete the consent form and then participated in the study. The collected data were analyzed by statistical methods in SPSS version 16. P-value less than 5% was considered as significant.

3. Results

Among the 150 students, 52.6% were women and the rest of them were men. The mean age of students was 22.2 ± 6 years (range: 18-40) and 83.3% of them were in age group 18-24 years. 84.6% of students were married that of them 22.1% had history of Methylphenidate use. 55.3% were non-dormitory of which 26.5% had a history of Methylphenidate use and of the 70% of PhD students, 28.6% had history of taking Methylphenidate. The history of smoking, alcohol, opium and psychotropic drugs were 26.6%, 16%, 4.6% and 2.6% among students that 75% of psychiatric drug users had a history of Methylphenidate use. There was a significant relationship between the level of education, gender, age, marital status and history of smoking, alcohol, opium and psychotropic drugs with a history of Methylphenidate abuse (Table 1). 81.6% of students referred to thinking and memory disorder as the least motivation in using Methylphenidate and 63.2% increased self esteem as the most important motivation for Methylphenidate abuse and the relationship between motivation and Methylphenidate abuse was significant ($p = 0.001$) (Table 2). 22.2% of Students were willing to offer Methylphenidate to their friends but there was no relationship between students' behavioral intent and Methylphenidate abuse (Table 3). 65.8% of students pointed to Methylphenidate consumers as self-confident people and 39.5% known them as inexperienced people (Figure 1). The most commonly used Methylphenidate users were dentistry students with 72.7% and the least consumed in the field of health with 5% which was statistically significant ($p = 0.001$) (Figure 2). 63.2% of the students responded negatively to Methylphenidate's suggestion that the relationship between the field of study and Methylphenidate consumption was statistically significant ($p = 0.001$). Also, the relationship between behavioral tendencies and behavioral intention of students with the field of study was statistically significant ($P = 0.001$) 60% of students say no for using Methylphenidate (Figure 3).

4. Discussion

The mean age of students in the study was 22.2 ± 6 years which was lower than the internal studies done by Fallah and Jalilian et al., with an average age of 22.68 years^{12,13}.

Table 1. Relationship between Methylphenidate abuse by demographic variables among students

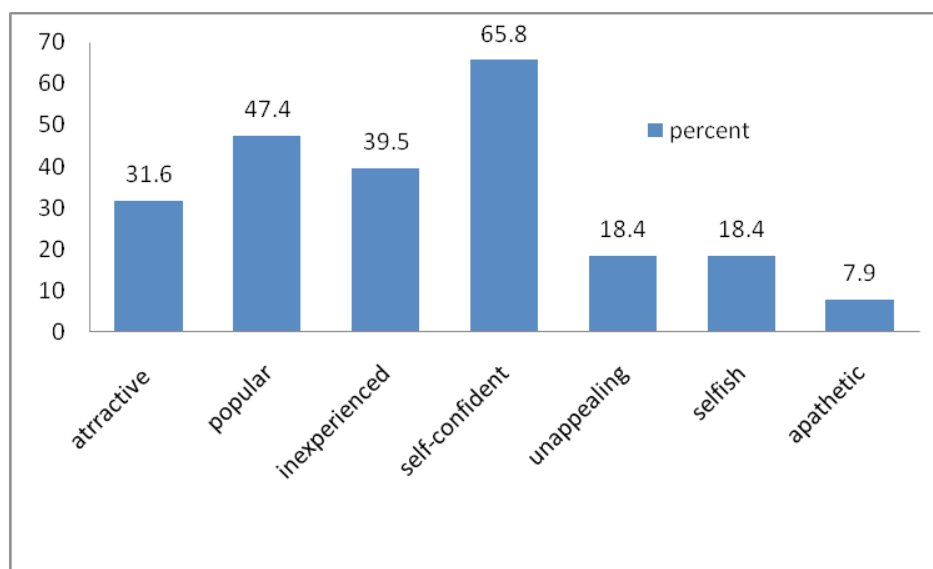
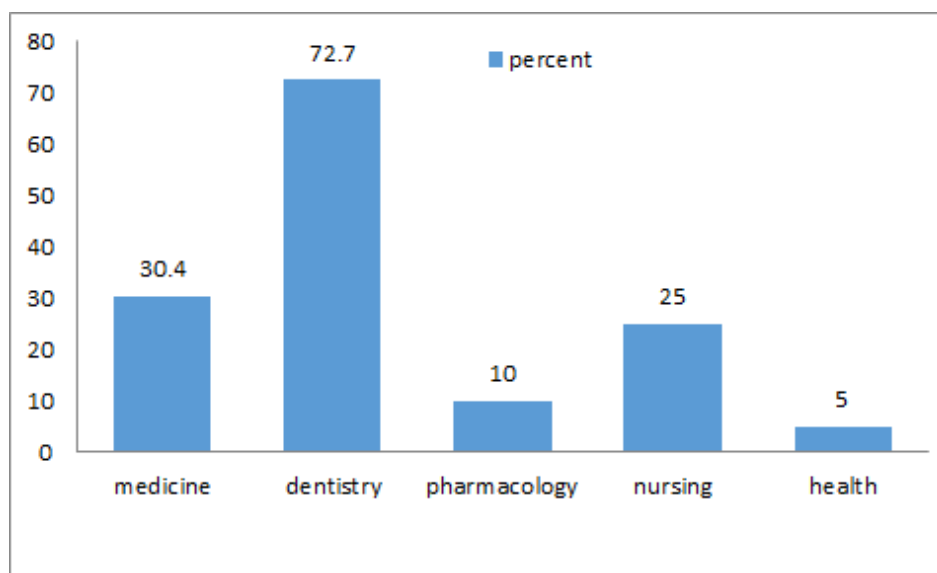
Variables		Methylphenidate abuse						p-value
		yes		no		Total		
		n	%	n	%	n	%	
Education level	Doctoral	30	28.6	75	71.4	105	100	0.016
	Bachelor	8	17.8	37	82.2	45	100	
Sex	f	12	15.2	67	84.8	79	100	0.003
	m	26	36.6	45	63.4	71	100	
Marital status	Single	10	43.5	13	56.5	23	100	0.03
	Married	28	22.1	99	77.9	127	100	
age	24-18	26	20.8	99	79.2	125	100	0.017
	30-25	11	47.8	12	52.2	23	100	
	40-30	1	50	1	50	2	100	
Residence place	Dorm	16	23.9	51	76.1	67	100	0.71
	Non-dorm	22	26.5	61	73.5	83	100	
History of smoking use	+	22	55	18	45	40	100	0.001
	-	16	14.5	94	85.5	110	100	
History of alcohol use	+	15	62.5	9	37.5	24	100	0.001
	-	23	18.3	103	81.7	126	100	
History of Psychotropic drugs use	+	3	75	1	25	4	100	0.02
	-	35	24	111	76	146	100	
History of Opium use	+	5	71.4	2	25.6	7	100	0.004
	-	33	23.1	110	76.9	143	100	

Table 2. Relation between attitude and tendency to Methylphenidate abuse among students

Students Attitude	Tendency rate to Methylphenidate abuse						p-value
	Few		Moderate		More		
	n	%	n	%	n	%	
Creating excitement and joy	15	39.5	21	55.3	2	5.3	0.001
Create a feeling of peace	9	23.7	23	60.5	6	15.8	
Impairment of thinking and memory	31	81.6	5	13.2	2	5.3	
Increase your relationship with friends	26	68.4	9	23.7	3	7.9	
Increased focus on doing homework	1	2.6	8	21.1	29	7.6	
Creates a distraction	24	63.2	13	34.2	1	2.6	
Creating dependency and addiction	21	55.3	16	42.1	1	2.6	
increasing the self confidence	5	13.2	9	23.7	24	63.2	
The prevalence of taking Methylphenidate among friends	9	23.7	24	63.2	5	13.2	
Use Methylphenidate to focus more on students' lessons	3	7.9	14	36.8	21	55.3	
Accept friend comments about taking Methylphenidate	5	13.2	28	73.7	5	13.2	
Confirmation of taking Methylphenidate from friends	12	31.6	24	63.2	2	5.3	
The ethical benefits of taking Methylphenidate without a doctor's prescription	10	26.3	22	57.9	6	15.8	

Table 3. Relation between behavior of students and Methylphenidate abuse

Behavior of students		Methylphenidate abuse						p-value
		+		-		Total		
		n	%	n	%	n	%	
Use of Methylphenidate for more focus on lessons	Yes	2	12.5	14	87.5	16	100	0.21
	No	36	26.9	98	73.1	134	100	
Use of Methylphenidate during examination	Yes	9	19.1	38	80.9	47	100	0.24
	No	29	28.2	74	71.8	103	100	
Recommendation to use Methylphenidate to friends	Yes	4	22.2	14	77.8	18	100	0.75
	No	34	25.8	98	74.2	132	100	

**Figure 1.** Attitude of students about the Methylphenidate consumers.**Figure 2.** History of Methylphenidate use among students by fields.

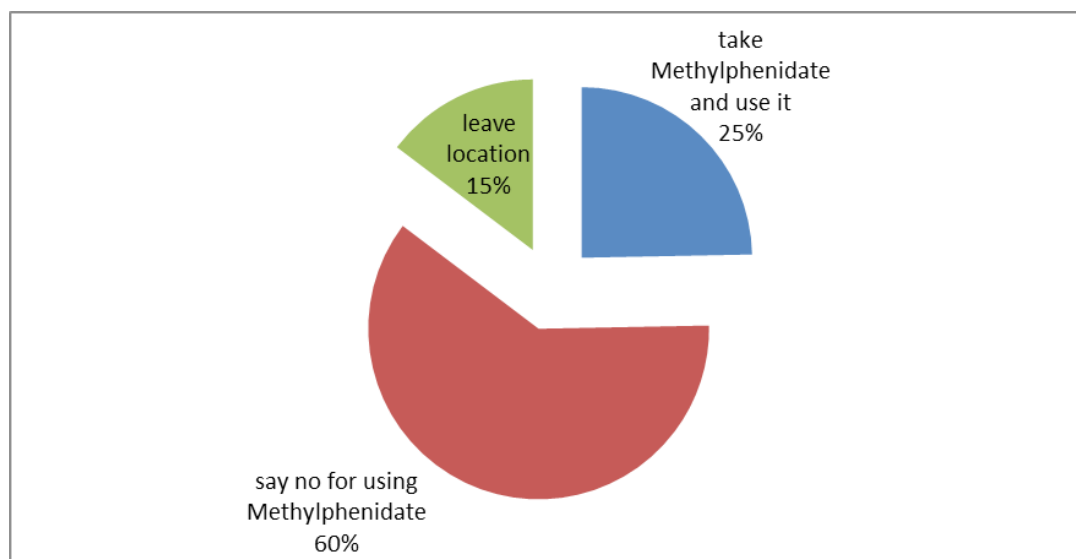


Figure 3. Tendencies of students in exposure with Methylphenidate use.

In the recent study by increasing age, the percentage of consumers also increased and the age range of 30-40 years old has the highest number of consumers which may be due to not denying the use of Methylphenidate by age. The present study showed that male students had twice as much Methylphenidate use as female students while more than half of the students were women. 25.3% of students had Methylphenidate abuse and the prevalence of consumption among PhD students was higher than Bachelor students. Dentistry and hygiene students had highest and lowest rate of Methylphenidate abuse. In Low et al., this value was 35.5%, in White et al study was 16%. In the study of Habibzadeh et al., in Tabriz, the prevalence of Methylphenidate consumption was 8.7% and in the study by Jalilian et al., it was 5.4% which was lower than the present study.^{4,13-15}. Different studies have shown that partnership in a high-risk behavior is associated with participation in other high risk behaviors¹⁶. For example, use of smoking is seen with hookah, alcohol or other opium use¹⁷⁻¹⁹. More than half of the students in the recent study had a history of smoking, alcohol, psychotropic drugs and Methylphenidate abuse which was higher than other internal studies^{13,20}. Similar to our study, other studies have shown that the use of AOD (Alcohol and Other Drugs) among drug users was more than people who do not use these drugs for example the use of cigarettes, alcohol, cocaine and amphetamines in these individuals is more than the general population. In this

study, Methylphenidate users also had a high percentage of smoking, alcohol and other substances for example 75% of drug users had history of Methylphenidate use^{1,21}. In the recent study, 63.2% of students pointed to increasing self-confidence and 55.3% pointed to more focus on the lessons as the highest motivation and pointed to the disorder of thinking and memory with 81.6% and addiction and creating dependency with 55.3% were the lowest motivation for taking Methylphenidate. Studies have shown that the more motivation of students to use stimulant drugs has been to increase their concentration and increase the level of consciousness and performance. For example, in the study of Teter et al., raising focus and consciousness with 53% and 48% are the motivation for taking Methylphenidate.^{14,21-25}. The lack of attractiveness was the highest students' attitude toward Methylphenidate consumers and lack of confidence is another characteristic of Methylphenidate users which in line with our study results²⁶⁻²⁹. The desire to engage in high risk behaviors is called behavioral tendencies that its importance has been shown in many studies. In the present study, say no to the use of Methylphenidate was one of the main characteristics of students²⁹⁻³¹. Behavioral intention is one of the motivational factors influencing behavior. The recommendation to use Methylphenidate to the friends was the behavioral intention of students. Studies have shown that the role and influence of friends in the abuse of Methylphenidate is effective and students by increasing

their living skills especially against the insistence of others, learn to say no and do not feel emotional with the suggestion of consuming substances^{32,33}.

5. Conclusion

The results indicated that increasing self-confident and improving focus during the study are the main reasons for the student's tendency to Methylphenidate abuse that can be prevented by teaching life skills to students and providing educational programs on appropriate study methods especially during the academic term and promoting a negative tendency toward Methylphenidate abuse.

6. Acknowledgement

We want to thanks all Ardabil Medical students who participated in the study and complete the questionnaire and also thanks pharmacology students for help us in data collection.

7. References

- McCabe SE, Knight JR, Teter CJ, Wechsler H. Non-medical use of prescription stimulants among US college students: Prevalence and correlates from a national survey. *Addiction*. 2005; 100(1):96–106. <https://doi.org/10.1111/j.1360-0443.2005.00944.x> PMID:15598197
- Morton WA, Stockton GG. Methylphenidate abuse and psychiatric side effects. *Primary Care Companion to the Journal of Clinical Psychiatry*. 2000; 2(5):159. <https://doi.org/10.4088/PCC.v02n0502>
- Challman TD, Lipsky JJ, editors. *Methylphenidate: Its pharmacology and uses*. Mayo Clinic Proceedings; Elsevier. 2000. PMID:10907387
- White BP, Becker-Blease KA, Grace-Bishop K. Stimulant medication use, misuse, and abuse in an undergraduate and graduate student sample. *Journal of American College Health*. 2006; 54(5):261–8. <https://doi.org/10.3200/JACH.54.5.261-268> PMID:16539218
- Shillington AM, Reed MB, Lange JE, Clapp JD, Henry S. College undergraduate Methylphenidate abusers in southwestern California: Protective and risk factors. *Journal of Drug Issues*. 2006; 36(4):999–1014. <https://doi.org/10.1177/002204260603600411>
- Kickbusch I, Nutbeam D. *Health promotion glossary*. Geneva: World Health Organization; 1998. p. 14.
- Grunbaum JA, Kann L, Kinchen S, Ross J, Hawkins J, Lowry R, et al. Youth risk behavior surveillance- United States, 2003. *Morbidity and Mortality Weekly Report Surveillance Summaries* (Washington, DC: 2002). 2004; 53(2):1–96.
- de Guzman MR, Bosch KR. G07-1715 High-risk behaviors among Youth; 2007.
- Gore FM, Bloem PJ, Patton GC, Ferguson J, Joseph V, Coffey C, et al. Global burden of disease in young people aged 10–24 years: A systematic analysis. *The Lancet*. 2011; 377(9783):2093–102. [https://doi.org/10.1016/S0140-6736\(11\)60512-6](https://doi.org/10.1016/S0140-6736(11)60512-6)
- Tonglet M, Phillips PS, Read AD. Using the theory of planned behaviour to investigate the determinants of recycling behaviour: A case study from Brixworth, UK. *Resources, Conservation and Recycling*. 2004; 41(3):191–214. <https://doi.org/10.1016/j.resconrec.2003.11.001>
- Ataee M, Hosseini N, Ahmadi Jouybari T, Jalilian F, Mirzaei Alavijeh M, Eslami AA, Aghaei A. Application of prototype/willingness model in describes Methylphenidate abuse behavior among college students. *J Health Syst Res*. 2014; 10(2):335–344.
- Fallah G, Moudi S, Hamidia A, Bijani A. Stimulant use in medical students and residents requires more careful attention. *Caspian Journal of Internal Medicine*. 2018; 9(1):87. PMID:29387325 PMCID:PMC5771366
- Jalilian F, Karami-Matin B, Mirzaei Alavijeh M, Ataee M, Mahboubi M, Motlagh F, et al. Prevalence and factor related to methylphenidate abuse among Iranian medical college student: An Application of Theory of Planned Behavior. *Terapevticheskii Arkhiv*. 2013; 85(4s):22–7.
- Low KG, Gendaszek A. Illicit use of psychostimulants among college students: A preliminary study. *Psychology, Health and Medicine*. 2002; 7(3):283–7. <https://doi.org/10.1080/13548500220139386>
- Habibzadeh A, Alizadeh M, Malek A, Maghbooli L, Shoja MM, Ghabili K. Illicit methylphenidate use among Iranian medical students: Prevalence and knowledge. *Drug Design, Development and Therapy*. 2011; 5:71. PMID:21340040 PMCID:PMC3038997
- Brooks FM, Magnusson J, Spencer N, Morgan A. Adolescent multiple risk behaviour: an asset approach to the role of family, school and community. *Journal of Public Health*. 2012; 34(suppl_1):i48–i56.
- Primack BA, Sidani J, Agarwal AA, Shadel WG, Donny EC, Eissenberg TE. Prevalence of and associations with waterpipe tobacco smoking among US university students. *Annals of behavioral medicine*. 2008; 36(1):81–6. <https://doi.org/10.1007/s12160-008-9047-6> PMID:18719977 PMCID:PMC3004534
- Reed MB, Wang R, Shillington AM, Clapp JD, Lange JE. The relationship between alcohol use and cigarette smoking in a sample of undergraduate college students. *Addictive*

- Behaviors. 2007; 32(3):449–64. <https://doi.org/10.1016/j.addbeh.2006.05.016> PMID:16844313
19. Terry-McElrath YM, O'Malley PM, Johnston LD. Energy drinks, soft drinks, and substance use among US secondary school students. *Journal of Addiction Medicine*. 2014; 8(1):6. <https://doi.org/10.1097/01.ADM.0000435322.07020.53> PMID:24481080 PMCID:PMC3910223
 20. Safiri S, Rahimi-Movaghar A, Yunesian M, Sadeghi-Bazargani H, Shamsipour M, Mansournia MA, et al. Subgrouping of risky behaviors among Iranian college students: A latent class analysis. *Neuropsychiatric Disease and Treatment*. 2016; 12:1809. <https://doi.org/10.2147/NDT.S107349> PMID:27524898 PMCID:PMC4966499
 21. Teter CJ, McCabe SE, Cranford JA, Boyd CJ, Guthrie SK. Prevalence and motives for illicit use of prescription stimulants in an undergraduate student sample. *Journal of American College Health*. 2005; 53(6):253–62. <https://doi.org/10.3200/JACH.53.6.253-262> PMID:15900989
 22. Kollins SH, MacDonald EK, Rush CR. Assessing the abuse potential of methylphenidate in nonhuman and human subjects: a review. *Pharmacology Biochemistry and Behavior*. 2001; 68(3):611–27. [https://doi.org/10.1016/S0091-3057\(01\)00464-6](https://doi.org/10.1016/S0091-3057(01)00464-6)
 23. Weiner A. Emerging drugs of abuse in Connecticut. *Connecticut Medicine*. 2000; 64(1):19–23. PMID:10697361
 24. Roehrs T, Papineau K, Rosenthal L, Roth T. Sleepiness and the reinforcing and subjective effects of methylphenidate. *Experimental and Clinical Psychopharmacology*. 1999; 7(2):145. <https://doi.org/10.1037/1064-1297.7.2.145> PMID:10340154
 25. Johnston LD, O'Malley PM. Why do the nation's students use drugs and alcohol? Self-reported reasons from nine national surveys. *Journal of Drug Issues*. 1986; 16(1):29–66. <https://doi.org/10.1177/002204268601600103>
 26. Gibbons FX, Gerrard M. Predicting young adults' health risk behavior. *Journal of Personality and Social Psychology*. 1995; 69(3):505. <https://doi.org/10.1037/0022-3514.69.3.505>
 27. Lettow B, Vermunt JK, Vries H, Burdorf A, Empelen P. Clustering of drinker prototype characteristics: What characterizes the typical drinker? *British Journal of Psychology*. 2013; 104(3):382–99. <https://doi.org/10.1111/bjop.12000> PMID:23848388
 28. Norman P, Armitage CJ, Quigley C. The theory of planned behavior and binge drinking: Assessing the impact of binge drinker prototypes. *Addictive Behaviors*. 2007; 32(9):1753–68. <https://doi.org/10.1016/j.addbeh.2006.12.009> PMID:17270356
 29. Ravis A, Sheeran P, Armitage CJ. Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology*. 2006; 11(3):483–500. <https://doi.org/10.1348/135910705X70327> PMID:16870057
 30. Gibbons FX, Gerrard M, Ouellette JA, Burzette R. Cognitive antecedents to adolescent health risk: Discriminating between behavioral intention and behavioral willingness. *Psychology and Health*. 1998; 13(2):319–39. <https://doi.org/10.1080/08870449808406754>
 31. Hukkelberg SS, Dykstra JL. Using the prototype/willingness model to predict smoking behaviour among Norwegian adolescents. *Addictive Behaviors*. 2009; 34(3):270–6. <https://doi.org/10.1016/j.addbeh.2008.10.024> PMID:19095361
 32. Ajzen I. The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*. 1991; 50:179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
 33. Judson R, Langdon SW. Illicit use of prescription stimulants among college students: prescription status, motives, theory of planned behaviour, knowledge and self-diagnostic tendencies. *Psychology, Health and Medicine*. 2009; 14(1):97–104. <https://doi.org/10.1080/13548500802126723> PMID:19085316