Are the Recommended Taxonomies for the Stages of Youth Smoking Onset Consistent with Youth's Perceptions of Their Smoking Status?

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ABSTRACT

Background: To examine if the recommended taxonomies for the stages of youth smoking onset are aligned with the beliefs of smoking youth.

Methods: The SHAPES Tobacco Module was administered to 23,047 students (grades 9 to 13) in a convenience sample of 29 secondary schools during the 2000-2001 school year in the province of Ontario, Canada. Cross-tabs were used to compare a student's self-perceived smoking status to their smoking status as determined with the currently recommended stage taxonomies for smoking behaviour.

Results: The majority of students classified as regular smokers (52.4%) and experimental smokers (98.9%) did not actually consider themselves to be smokers. Self-reported smoking status appeared to be relatively consistent for the never smoker and established smoker categories.

Conclusions: Additional research is required to develop stage taxonomies that are aligned with the self-perceptions of non-established youth smokers.

MeSH terms: Smoking behavior; adolescent/youth; behavior taxonomy

La traduction du résumé se trouve à la fin de l'article.

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A large body of empirical and theoretical research has demonstrated that youth progress through a series of behavioural stages during the process of becoming a smoker.¹ However, the taxonomies used to define these stages in the literature are not consistent across most studies.^{1,2} Although researchers generally agree upon what constitutes a never smoker or an established smoker, there is considerable variation in the definitions for the different types of non-established smokers.²

Mayhew and colleagues¹ recently reviewed quantitative studies of youth smoking onset that incorporated different smoking stage taxonomies. The purpose was to identify similarities and differences related to smoking behaviour across studies and make recommendations for future research. The results of their review highlighted factors related to smoking stage progression and made recommendations pertaining to smoking stage measurement that were largely based on smoking frequency and volume. Although such taxonomies may be conceptually relevant to researchers, it is not clear that they accurately represent the perceptions of smoking youth.²

Qualitative studies with youth have found that defining adolescent smoking by frequency or volume is not how adolescents conceptualize their smoking behaviour.^{2,3} For instance, some occasional smokers maintain their sporadic smoking behaviour for an extended period of time without progressing to established daily use.^{4,5} Although the definitions outlined by Mayhew et al.¹ would classify these youth as established smokers, it is not clear that these youth would consider themselves to be smokers. If student perceptions are not aligned with the stage taxonomies used in research, interventions will be developed and targeted to youth who do not believe they are smokers, with the result that youth will be less apt to participate in the cessation programs being offered. Even the most effective programs will have limited impact unless they are widely used by youth.⁶

The purpose of this brief report was to examine if the stage taxonomies recommended by Mayhew and colleagues¹ are consistent with a global measure of how youth perceive their smoking behaviour.

TABLE 1

Demographic Characteristics Based on the Smoking Stage Taxonomies Recommended by Mayhew et al.¹

	Never Smokers				Non-Established Smokers					Regular Smoker		Established Smoker	
	Non-Susceptible Never Smoker (n=953)		Susceptible Never Smoker (n=5,949)		Tried Once Smoker (n=236)		Experimental Smoker (n=3,221)			Regular Smoker (n=790)		Established Smoker (n=3,239)	
	N	(%)	N	(%)	N	(%)	N	(%)		N	(%)	N	(%)
Gender													
Male	405	(42.7)	3100	(52.3)	110	(46.8)	1555	(48.5)	406	(51.5)	1664	(51.5)	
Female	544	(57.3)	2828	(47.7)	125	(53.2)	1650	(51.5)	382	(48.5)	1565	(48.5)	
Age													
≤11	0	(0.0)	7	(0.1)	0	(0.0)	1	(0.1)	0	(0.0)	10	(0.3)	
12	0	(0.0)	1	(0.1)	0	(0.0)	0	(0.0)	1	(0.1)	1	(0.1)	
13	8	(0.8)	48	(0.8)	0	(0.0)	7	(0.2)	0	(0.0)	7	(0.2)	
14	315	(33.1)	1392	(23.5)	41	(17.4)	463	(14.4)	86	(10.9)	252	(7.8)	
15	303	(31.8)	1654	(27.8)	63	(26.7)	820	(25.5)	171	(21.7)	607	(18.7)	
16	180	(18.9)	1292	(21.7)	56	(23.7)	772	(24.0)	180	(22.8)	856	(26.5)	
17	93	(9.7)	988	(16.6)	47	(19.9)	691	(21.4)	207	(26.2)	920	(28.4)	
≥18	54	(5.7)	561	(9.4)	29	(12.3)	466	(14.5)	145	(18.3)	583	(18.0)	
Grade													
9	429	(45.0)	1957	(32.9)	53	(22.4)	688	(21.4)	128	(16.2)	416	(12.8)	
10	261	(27.4)	1518	(25.5)	71	(30.1)	845	(26.2)	183	(23.2)	728	(22.5)	
11	146	(15.3)	1257	(21.1)	47	(19.9)	740	(23.0)	189	(23.9)	872	(26.9)	
12	84	(8.8)	850	(14.3)	45	(19.1)	649	(20.1)	196	(24.8)	935	(28.9)	
13	33	(3.5)	367	(6.2)	20	(8.5)	299	(9.3)	94	(11.9)	288	(8.9)	

METHODS

Design

This secondary analysis used cross-sectional data using the Tobacco Module of the School Health Action, Planning and Evaluation System (SHAPES), as described in an earlier report (the School Smoking Profile is now known as the SHAPES Tobacco Module).⁷ The Tobacco Module is a machine-readable questionnaire that takes approximately 20 minutes to complete in-class, designed to measure tobacco use behaviour and potential determinants of tobacco use.

Procedure

The SHAPES Tobacco Module was administered to students (grades 9 to 13) from a convenience sample of 29 secondary schools during the 2000-2001 school year in the province of Ontario, Canada. Active information with passive consent was used to reduce demands on schools and to increase participation rates. The researcher informed the parents of the students via mail, and asked them to call a toll-free phone number at their child's school only if they refused participation. The University of Waterloo Office of Research Ethics approved all procedures, including passive consent.

Participants

There were 29,805 students enrolled in the 29 secondary schools and 23,047 students enrolled in classes that participated in the survey. Overall, 95.9% (n=22,091) of eli-

gible students completed the Tobacco Module. Missing respondents resulted from absenteeism on the day of the survey (1.2%), student refusal (1.9%), and parental refusal (1.0%). Of the eligible students, 14,388 (65.1%) provided sufficient data to determine their smoking status using the recommended taxonomies.¹

Measures

The different stages of smoking behaviour were defined according to operational definitions provided by Mayhew et al.¹ using the self-reported student data collected in the Tobacco Module. Never smokers were defined as students who reported that they had never smoked a cigarette, not even a puff. Smoking susceptibility in never smokers was determined by three questions: a) "Do you think in the future you might try smoking cigarettes?", b) "If one of your best friends were to offer you a cigarette, would you smoke it?", and c) "At any time during the next year, do you think you will smoke a cigarette?" Students responded to these questions on a 4-point Likert scale. Students who answered 'definitely not' to all three questions were considered non-susceptible; they were considered susceptible if they responded positively to at least one item. *Tried once smokers* were defined as students who tried only a puff of one or two cigarettes and did not smoke in the last 12 months. *Experimental smokers* were defined as students who reported that they smoked more than once, smoked less than monthly, and smoked less than 100 cigarettes in their lifetime. *Regular smokers* were

defined as students who reported that they smoked more than once, smoked in the past month, and smoked more than 100 cigarettes in their lifetime. *Established smokers* were defined as students who smoked everyday or almost everyday. The global measure for self-perceived smoking status asked, "Are you a smoker?" Students responded either 'yes' or 'no'.

Analysis

Cross-tabs were used to compare a student's global self-perceived smoking status to their smoking status as determined with the recommended stage taxonomies outlined by Mayhew et al.¹

RESULTS

Demographic characteristics

Among the 14,388 students, 953 (6.6%) were classified as *non-susceptible never smokers*; 5,949 (41.4%) as *susceptible never smokers*; 236 (1.6%) as *tried once smokers*; 3,221 (22.4%) as *experimental smokers*; 790 (5.5%) as *regular smokers*; and 3,239 (22.5%) as *established smokers* using self-reported data and the operational definitions provided by Mayhew et al.¹ Average age was 15.7 (±1.3) years. The sample was 50.5% male and 49.5% female. A summary of the demographic characteristics is presented in Table I.

Smoking status and smoking perceptions

The smoking stage taxonomies recommended by Mayhew et al.¹ are not clearly

TABLE II

Comparison of the Smoking Stage Taxonomies Recommended by Mayhew et al.¹ to Youth's Perceptions of Their Smoking Behaviour

Smoking Stage	Operational Definition	Are You a Smoker?			
		Yes N	(%)	No N	(%)
Never Smoker	Never smoked a cigarette, not even a puff:				
i) Non-Susceptible	i) Does not intend to smoke in the future	5	(0.5)	948	(99.5)
ii) Susceptible	ii) Intends to try smoking at some point in the future	9	(0.2)	5939	(99.8)
Tried Once Smoker	Tried only a puff of one or two cigarettes. Did not smoke in last 12 months	23	(9.8)	211	(90.2)
Experimental Smoker	Smoked more than once, smoked less than monthly, smoked <100 cigarettes	33	(1.1)	2937	(98.9)
Regular Smoker	Smoked more than once, smoked in past month, smoked 100+ cigarettes	333	(47.6)	366	(52.4)
Established Smoker	Smokes everyday or almost everyday	2770	(95.5)	130	(4.5)

aligned with the global perceptions of smoking youth (Table II). Over half of the students classified as regular smokers (52.4%) and almost all of the students classified as experimental smokers (98.9%) did not actually consider themselves to be smokers. Moreover, 9.8% of students who had tried smoking on only one occasion did consider themselves to be smokers. Self-reported smoking status was consistent for the never smoker and established smoker categories.

DISCUSSION

This straightforward study found that the taxonomies for smoking onset recommended by Mayhew and colleagues¹ are inconsistent with the beliefs of most youth smokers. In particular, the majority of the youth that researchers would classify as non-established smokers do not consider themselves to be smokers. This is consistent with research demonstrating that youth who smoke occasionally eschew traditional smoking-reference labels.⁸ Because the population of non-established smokers represents such a large portion of the youth smoking population (56.7%), it is important to ensure that we accurately categorize these youth in ways that are meaningful to both researchers and smoking youth.

Additional research is required to develop more robust taxonomies for defining non-established smoking in the empirical literature. This can be accomplished in at least two ways. First, we can try to change the beliefs of youth we classify as non-established smokers so that their self-perceptions more accurately correspond with existing stage theories. For instance, media campaigns and/or educational interventions could be used to help inform non-daily smokers that "cessation" programs may be helpful in preventing them from becoming established or "addicted" smokers. Alternatively, we can develop new

stage taxonomies that are more aligned with the beliefs of non-established smokers – for instance, definitions that not only consider frequency and volume, but also patterns of smoking behaviour and smoking beliefs. If researchers are unable to develop smoking onset models that accurately reflect the actual determinants and patterns of smoking among non-established smokers, it may be wise to abandon taxonomies for these non-addicted youth.⁹

The results of this paper also demonstrate how school-based data collection systems, such as SHAPES, could be strengthened. For instance, ongoing monitoring would allow researchers to determine the timing, sequence and direction of transitions in youth smoking behaviour. It would also be beneficial if the quantitative data collection were complimented with parallel qualitative data collection among student subpopulations. These data would make it possible for researchers to have a more robust understanding of youth smoking behaviour.

Limitations

The measure for self-perceived smoking status is based on a very simple global measure. Although more fine-grained measures of self-perceived smoking status may make for more detailed analytical comparisons, the basic measure used in this paper represents the common manner in which school-based programs would generally recruit youth to smoking cessation programming activities (e.g., If you are a smoker interested in quitting, join program X). Causal relationships cannot be inferred from these cross-sectional data. Data were also based on self-reports, so the validity of the responses may be questioned. However, the measures in the Tobacco Module have been previously demonstrated to be reliable and valid; honest reporting was encouraged by ensuring confidentiality during data collection; and

some students were asked to provide pre-announced saliva samples for biochemical validation to further encourage honest reporting.

CONCLUSION

The stage taxonomies for youth smoking progression commonly used in the tobacco control literature are not aligned with the self-perceptions of youth who are non-established smokers. Additional research is required to develop stage taxonomies that are more aligned with the beliefs of youth smokers they are meant to address. Robust definitions of non-established smoking behaviour could improve our understanding of the needs of these different types of at-risk youth so that cessation program resources can be targeted to the groups of non-established smokers who would be most likely to use them.

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RÉSUMÉ

Contexte : Déterminer si la taxonomie recommandée des étapes menant à la décision de fumer chez les jeunes correspond aux perceptions des jeunes fumeurs.

Méthode : Le module sur le tabagisme du système SHAPES (School Health Action Planning and Evaluation System) a été administré à 23 047 élèves (de la 9^e à la 13^e année) d'un échantillon de commodité de 29 écoles secondaires pendant l'année scolaire 2000-2001 dans la province de l'Ontario. Par croisement des données, nous avons comparé l'usage du tabac perçu par l'élève et l'étape où en est cet élève selon la taxonomie actuellement recommandée de l'usage du tabac.

Résultats : Une majorité d'élèves se classait dans la catégorie des fumeurs réguliers (52,4 %), mais les fumeurs à titre expérimental (98,9 %) ne se considéraient pas vraiment comme étant des fumeurs. L'usage du tabac déclaré par l'intéressé correspondait assez bien à la taxonomie recommandée dans la catégorie des personnes n'ayant jamais fumé et dans celle des fumeurs permanents.

Conclusions : Il faudrait pousser la recherche pour élaborer une taxonomie qui corresponde aux auto-perceptions des jeunes fumeurs qui ne fument pas encore régulièrement.

Book Reviews/Recension

Comparative Quantification of Health Risks. Global and Regional Burden of Disease Attributable to Selected Major Risk Factors

Majid Ezzati, Alan D. Lopez, Anthony Rodgers, Christopher J.L. Murray (Eds.), Geneva, Switzerland: World Health Organization, 2004; 2271 pp

This work, published by the World Health Organization (WHO), is a compilation and integration of research coordinated by WHO to quantify population-level effects associated with various hazardous exposures through the comparative risk assessment project. This work attempts to apply conceptual and methodological consistency to help provide quantitative evidence for public policy decisions to reduce hazards to health. Thus, the intended audience would be public policy-makers and scientists as well as those people working with global health issues.

The CD-ROM is organized into two volumes with chapters grouped into sections. The first volume contains a chapter describing the conceptual framework and methodological issues (Chapter 1) as well as sections on childhood and maternal nutrition, other nutrition-related risk factors and physical inactivity, and addictive

substances. Volume two contains sections on sexual and reproductive health, environmental and occupational risk factors, other selected risk factors, distribution of risk factors by poverty, data analysis and results, and multi-risk factor assessment.

Except for Chapter 1 and those included in the latter three sections, each chapter focuses on a specific risk factor. Within each of these chapters, the authors define the risk factor, provide a review of previous literature and describe the process of compiling data. Prevalence of the risk factor and measures of association between exposures and outcomes are reported by age, sex and global subregion where possible. There is also a discussion regarding levels of uncertainty, the assumptions made and the limitations of the investigation. In most cases, there is an attempt to predict future trends. In addition to the information presented in the chapters, the CD-ROM contains additional data tables for each exposure, available in Excel and PDF formats.

The final three sections are spent examining the associations between risk factors of interest and poverty; reporting the analytic methods used to derive estimates and to consider multiple risk factor interventions; and presenting some of the results for individual and joint effects as well as

providing a summary of the conclusions and directions for future research.

Reading the entirety of this work could be tedious. It is long and some parts may be too detailed for all readers. To fully appreciate this work, the reader should have a strong grasp of epidemiology and efforts should be made to understand the methods and concepts as well as the assumptions and limitations revolving around the project in order to interpret the results appropriately. However, I believe this CD-ROM would be a good resource for scientists and policy-makers requiring quantitative results to aid in decision-making for global public health.

This work is available free at the following website: "<http://www.who.int/publications/cra/en/>" (accessed November 1, 2005). Additional data tables in both PDF and Excel files are available on the CD-ROM under "Annexes", available through WHO at a price of \$180 US.

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