

- 14 Chassin L, Presson CC, Rose J, et al. Parenting style and smoking-specific parenting practices as predictors of adolescent smoking onset. *J Pediatr Psychol* 2005;30: 333–44.
- 15 Dalton MA, Adachi-Mejia AM, Longacre MR, et al. Parental rules and monitoring of children's movie viewing associated with children's risk for smoking and drinking. *Pediatrics* 2006;118:1932–42.
- 16 Ford A, Mackintosh AM, Moodie C, et al. Cigarette pack design and adolescent smoking susceptibility: a cross-sectional survey. *BMJ Open* 2013;3: e003282.
- 17 Carpenter C, Cook PJ. Cigarette taxes and youth smoking: new evidence from national, state, and local Youth Risk Behavior Surveys. *J Health Econ* 2008;27: 287–99.
- 18 DiFranza JR, Savageau JA, Fletcher KE. Enforcement of underage sales laws as a predictor of daily smoking among adolescents: a national study. *BMC Public Health* 2009;9:107.
- 19 Sundh M, Hagquist C. Does a minimum-age law for purchasing tobacco make any difference? Swedish experiences over eight years. *Eur J Public Health* 2007;17: 171–7.
- 20 European Commission. Eurobarometer 77.1, February–March 2012. GESIS Data Archive: ZA5597, dataset version 2.0.0 (2012). TNS OPINION & SOCIAL, Brussels, 2012.
- 21 United Nations Statistics Division. Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings. 2012.
- 22 Morgenstern M, Sargent JD, Engels RC, et al. Smoking in European adolescents: relation between media influences, family affluence, and migration background. *Addict Behav* 2013;38:2589–95.
- 23 Agaku IT, Filippidis FT, Vardavas CI, et al. Poly-tobacco use among adults in 44 countries during 2008–2012: evidence for an integrative and comprehensive approach in tobacco control. *Drug Alcohol Depend* 2014;139:60–70.

.....
European Journal of Public Health, Vol. 25, No. 5, 818–823

© The Author 2015. Published by Oxford University Press on behalf of the European Public Health Association. All rights reserved.
doi:10.1093/eurpub/ckv069 Advance Access published on 10 April 2015

Cultural capital and smoking in young adults: applying new indicators to explore social inequalities in health behaviour

Thierry Gagné¹, Katherine L. Frohlich¹, Thomas Abel²

1 Université de Montréal, École de Santé Publique, Institut de recherche en santé publique de l'Université de Montréal, Montréal, QC, H3N 1X7, Canada

2 University of Bern, Institute for Social and Preventive Medicine, 3012 Bern, Switzerland

Correspondence: Thierry Gagné, 7101 avenue du Parc, bureau 3126, Montréal, QC, H3N 1X7, Canada, Tel: +1 438-993-3094, Fax: +1 514-343-2207, e-mail: thierry.gagne@umontreal.ca

Background: Associations between social status and health behaviours are well documented, but the mechanisms involved are less understood. Cultural capital theory may contribute to a better understanding by expanding the scope of inequality indicators to include individuals' knowledge, skills, beliefs and material goods to examine how these indicators impact individuals' health lifestyles. We explore the structure and applicability of a set of cultural capital indicators in the empirical exploration of smoking behaviour among young male adults. **Methods:** We analysed data from the Swiss Federal Survey of Adolescents (CH-X) 2010–11 panel of young Swiss males ($n = 10\,736$). A set of nine theoretically relevant variables (including incorporated, institutionalized and objectified cultural capital) were investigated using exploratory factor analysis. Regression models were run to observe the association between factor scores and smoking outcomes. Outcome measures consisted of daily smoking status and the number of cigarettes smoked by daily smokers. **Results:** Cultural capital indicators aggregated in a three-factor solution representing 'health values', 'education and knowledge' and 'family resources'. Each factor score predicted the smoking outcomes. In young males, scoring low on health values, education and knowledge and family resources was associated with a higher risk of being a daily smoker and of smoking more cigarettes daily. **Conclusion:** Cultural capital measures that include, but go beyond, educational attainment can improve prediction models of smoking in young male adults. New measures of cultural capital may thus contribute to our understanding of the social status-based resources that individuals can use towards health behaviours.

Introduction

Young adults have the highest rates of smoking across all age groups and social inequalities in smoking among them are as conspicuous as in adults.^{1,2} These inequalities include a large range of pathways—through parents, friends and schooling—making young adults vulnerable to smoking uptake, heavy smoking, persistent smoking and lack of success in quitting.³ One of the obstacles to understanding these inequalities resides in our limited ability to properly assess young adults' social status with respect to health behaviours. Education is often assumed to be one of the more precise indicators of social status, especially in young adults.⁴ But

while educational attainment is useful as a parsimonious measure, it fails to encompass the various components acquired through educational experience.⁵ In this regard, the concept of cultural capital is being increasingly explored to examine the specific cultural factors that relate to individuals' social status and health lifestyles.⁶ Defined broadly as the knowledge, skills, values and norms accumulated through education and life-long socialization,⁷ cultural capital has garnered growing interest with respect to social inequalities in health^{6–9} and has been employed in many empirical studies to explore inequalities in health.^{10–12}

The most established typology of forms of cultural capital describes cultural capital in three states: institutionalized

(diplomas and certificates), objectified (cultural and educational goods in the household) and incorporated (durable knowledge, skills and beliefs).¹³ Educational attainment, as a source of status and prestige, can be viewed as one of the central elements of cultural capital. However, other elements of cultural capital are necessary to explain both a successful educational career and better access to health.^{14,15} To specify these elements, we suggest to apply a set of criteria: (i) cultural capital consists of resources for human action, social distinction and the (re-) production of social privileges; (ii) such resources are unequally distributed and bound in power relationships, meaning that individuals who own more capital have more control over its re-distribution and (iii) elements of cultural capital function in terms of volume and composition and offer varying potential for accumulation and convertibility.¹⁶ Applied to health inequalities, cultural capital becomes relevant when the power and social privilege that come with it are linked to individuals' chances of being in good health. Following these criteria, health-related incorporated cultural capital should then include measures of health relevant values, knowledge and skills that can be assumed to be unequally distributed among social classes and transmitted, accumulated and incorporated over time in families, schools, etc. In this way, incorporated cultural capital affects health behaviour and broader lifestyles through dynamics of distinction, access of health information and agency.¹⁷

In the context of smoking, this means that the values, skills and goods that young adults acquire through socialization and schooling impact their chances of initiating or quitting smoking. Incorporating these elements of cultural capital should produce a stronger portrait of social inequalities in smoking beyond the association attributed to educational credentials. Studies of Norwegian young adults for example found differences in the number of books in the household and the patterns of media consumption (objectified and incorporated cultural capital) among daily, occasional and non-smokers.^{18,19} Similarly, Schori *et al.*²⁰ found that health orientation (incorporated cultural capital) among Swiss young male adults was a significant predictor of smoking, independent of their educational status (institutionalized cultural capital). Thus, there are theoretical and empirical indications that different elements of cultural capital should be considered for its operationalization.

Further work is now needed to assess the different components related to cultural capital and health behaviours. Depending on the population of interest, health inequality studies have measured cultural capital using numerous indicators: the individual's and their parents' education; parental self-efficacy; computer ownership; internet access and use; the number of newspaper or books in the household; the individual's and parents' museum, opera or theatre attendance; reading frequency and more.^{21–24} In single studies, however, measurements of cultural capital relying on few indicators—e.g. only a scale of participation in the arts—have been criticized in the sociology literature as measuring only one facet of the concept.²⁵ A further problem persists in the assessment of cultural capital, particularly among young adults. Using parental characteristics to assess youth capital remains commonplace, and yet young adults are at a transitional age where their own social characteristics are becoming more powerful explanatory variables.^{26,27} Though their adult life has just begun, the cultural capital in the family (i.e. that of the parents) still may play an important role. A full account of cultural capital in young adults should therefore consider both individual and parental educational characteristics.

The objective of this article is to examine social inequalities in smoking among Swiss young male adults using an expanded cultural capital approach. Given that the development and application of the concept of cultural capital in public health research is still a recent enterprise when compared to the extensive scholarly work on economic and social capital, we focus on a new assessment of young male adults' cultural capital, incorporating indicators of knowledge, values, skills and goods relevant to smoking.

To examine smoking behaviour among young male adults, we focus on two specific outcomes: daily smoking and frequency of cigarette consumption among daily smokers.

Methods

Data

We analyzed data from the 2010–11 panel of the Swiss Federal Surveys of Adolescents CH-X project. The target population was Swiss males, aged 18–25 years. Data for the sample were collected at six national recruiting centres in Switzerland during recruitment for military service. Because recruitment is compulsory for all Swiss men, our sample also included individuals unfit for military service and those opting for civil service. As such, our sample can be considered a population sample. Because local administrative records provide only crude numbers of participants, the exact response rate could not be calculated. Reports from field staff show that refusals are rare and a recent study in two recruitment centres, using a similar sampling procedure, reported a 95% response rate.²⁸ More information on the survey design is available elsewhere.²⁹

Participants completed questionnaires (on a voluntary and anonymous basis) administered by non-military personnel. From the initial sample of 10 740, we removed four individuals who had no data on both predictors and outcomes, for a final $n = 10\,736$.

Measures

We used cultural capital indicators representing the different forms of cultural capital (Supplementary figure S1 presents the indicators and the actual questions used). 'Number of books in the household' represents objectified cultural capital in the family. The individual's, mother's and father's education represent institutionalized cultural capital. Incorporated cultural capital includes health values ('significance of health for the individual and the family', 'general interest in health', 'importance of health risks and conditions when choosing a future job') and health knowledge and skills ('ability to critically assess health information on the web and to evaluate common illness symptoms'). 'Number of books in the household', 'parents' education' and 'own education' are established indicators of cultural capital.^{10,11,20} All other indicators listed were developed by the CH-X project team to operationalize items relevant to young adults' health values, knowledge and skills.

The 'symptom knowledge' variable was developed as a measure of functional health literacy. The scale comprised 17 items as a summed continuous score (with listwise deletion) in which participants were asked to evaluate which health conditions would warrant a doctor's visit. Content validity was established with a panel of five medical experts. Higher scores indicate better health knowledge ($\alpha = 0.73$, mean = 12.97, SD = 2.60, skewness = -0.822, kurtosis = 0.368 before imputation). The variable was then transformed into an ordinal one with four quartiles. 'Individual education' was obtained by asking 'What school did you attend during the last mandatory school year?' 'Parental education' was obtained asking 'What is your father's/mother's highest level of education?' 'Number of books' was obtained asking 'How many books are in your parents' house?', with five possible answers ranging from '0 to 10' to '401 and more'. For smoking outcomes, we used two variables. 'Daily smoking status' was based on the question 'Do you smoke?'; answers were recoded to create a dichotomous variable 'Daily' vs. 'Non-daily' (non-daily merging occasional and non-smokers). 'Number of cigarettes smoked daily in daily smokers' was measured as a continuous outcome with the question 'In a normal week, how many cigarettes do you smoke on average per day?', with a seven-point response scale ranging from 'less than one' to '25 and more'.

Statistical analyses

Since we used multiple variables, some with a high number of missing values, we employed multiple imputation to handle the missing data and enable us to make full use of our sample.³⁰ Only three variables in our analyses have more than 5% missing values: mother's education (16%), father's education (14%) and symptom evaluation (42%). We found no differences in proportions of missing data among smoking outcomes. Multiple imputation was carried out using 10 imputed datasets taking into account the categorical nature of our variables. From the total $n = 10\,736$, the daily smokers average across 10 imputations was $n = 3254$.

To explore the interrelationships of our indicators, we applied exploratory factor analysis (EFA). EFA is primarily a preliminary statistical exercise for validation purposes, although it can also be used in inductive approaches to find latent dimensions of a broad concept.²⁷ Before multiple imputation, we first conducted a plausible factor solution to observe the optimal number of factors and items. We then conducted the EFAs in each imputed dataset. From the factor solutions, we computed a non-refined factor score in each dataset by summing the values of standardized indicators weighted by the loading on their corresponding factor.³¹ Extraction and rotation procedures for the EFAs were performed using weighted least squares (WLSMV) and oblique GEOMIN, the standard methods for categorical indicators and correlated factors in MPlus.³²

To observe the association between cultural capital and daily smoking status, we conducted a Poisson regression model with robust variance estimation. To examine the association between cultural capital and frequency of cigarette consumption among daily smokers, we conducted a multiple linear regression model. To observe factor scores' predictive strength on smoking outcomes, we report unstandardized and standardized coefficients, point estimates and their 95% confidence intervals (CIs). We used participants' age, self-rated health and weekly alcohol consumption as control variables in both regression models. All analyses were conducted using MPlus 6.12.³²

Results

Study participants' characteristics

Table 1 presents the distributions of socio-demographic, educational and smoking variables, whereas Supplementary table S1 shows the distributions of other cultural capital items (both before multiple imputation procedures). The sample has a mean age of 19 years. Thirty percent of the sample identified as daily smokers, a finding consistent with other Swiss prevalence values.³³ Among daily smokers, 17.7% smoked less than 10 cigarettes per day, 45.8% smoked between 10 and 20 cigarettes per day and 36.5% smoked more than 20 cigarettes per day.

Factor solution of cultural capital indicators

Table 2 presents the factor solutions obtained in each imputed dataset. Using a 0.3 cut-off value for loadings, we removed items that did not reach this cut-off on any factor (the two '... when choosing a future job' items). Given the eigenvalue ≥ 1 and scree plot tests, our results suggested a three-factor solution, each with three items. General interest in health, significance of healthy lifestyle for oneself and for the family loaded on the first factor, entitled 'health values'. Own education, critical assessment of health information on the web and knowing when to seek professional help for health problems loaded on the second factor, 'education and knowledge'. Father's and mother's education as well as the number of books in the household all loaded on the third factor, 'family resources'. Presented in Supplementary table S2, polychoric correlations between the final cultural capital indicators are shown ranging from absent ($r = 0.005$) to

Table 1 Descriptive data of the initial CH-X sample used for the study ($n = 10\,736$)

Variable	N (valid %)	Missing values (% of sample)
Age		0 (0)
Mean (SD)	19.69 (0.94)	
Own education ^a		205 (1.9)
Low (mandatory or trade)	897 (8.5)	
Middle (vocational)	6108 (58.0)	
High (academic or more)	3526 (33.5)	
Father's education		1525 (14.2)
Lower secondary	321 (3.5)	
Upper secondary	4971 (54.0)	
Higher education	3919 (42.5)	
Mother's education		1704 (15.9)
Lower secondary	580 (6.4)	
Upper secondary	6101 (67.5)	
Higher education	2351 (26.0)	
Daily smoking		449 (4.2)
Non-daily smokers	7190 (69.9)	
Daily smokers	3097 (30.1)	
Number of cigarettes smoked		16 (0.5)
daily in daily smokers		
Less than 5	112 (3.6)	
Between 5 and 9	433 (14.0)	
Between 10 and 14	766 (24.7)	
Between 15 and 19	645 (20.8)	
Between 20 and 24	770 (24.9)	
Twenty-five or more	355 (11.5)	

a: In the Swiss education system, lower secondary (first half of high school) is mandatory and completed approximately at the age of 15 years. Upper secondary (latter half of high school) is divided between trade, vocational and academic paths. Both vocational and academic paths can lead to higher education (university). For individual education, we included the trade path with lower secondary and the academic path with higher education.

moderately strong ($r = 0.533$). The factor solutions each explain approximately 38% of the shared variance between indicators across imputed datasets.

Association between cultural capital factors and smoking outcomes

Tables 3 and 4 present the associations between cultural capital factor scores and smoking outcomes. Regarding daily smoking, the 'health values' [PR = 0.94 (95% CI: 0.92–0.96)] ($P < 0.001$) and 'education and knowledge' [PR = 0.77 (95% CI: 0.75–0.81)] ($P < 0.001$) scores were strongly associated with smoking. Other predictors being equal, young males had a 6% lower risk of being daily smokers for every additional unit in 'health values' score and a 23% lower risk for every additional unit in 'education and knowledge'. The 'family resources' score had a smaller effect [PR = 0.97 (95% CI: 0.96–0.99)], with a 2% lower risk of being a daily smoker for every additional unit.

Regarding the number of cigarettes smoked daily among daily smokers (table 4), we found significant associations with two of the factor scores: 'health values' [std. $\beta = -0.06$, (-0.09 , -0.02)] and 'education and knowledge' [std. $\beta = -0.15$, 95% CI (-0.19 , -0.11)] (both $P < 0.001$). Higher scores on 'health values' and 'education and knowledge' were associated with a lower number of cigarettes smoked daily among young male daily smokers. The 'family resources' factor score was not significantly associated with number of cigarettes smoked ($P = 0.23$).

Discussion

The aim of this article is to contribute to the ongoing development and refinement of cultural capital approaches in health inequality

Table 2 EFA of cultural capital indicators ($n = 10\,736$)^a

Variable	Factor loadings		
	Factor 1	Factor 2	Factor 3
1st factor: health values			
General interest in health	[0.649, 0.664]	[-0.076, -0.112]	[-0.022, -0.012]
Significance of one's own healthy lifestyle	[0.693, 0.707]	[-0.005, 0.079]	[0.016, 0.033]
Significance of healthy lifestyle in the family	[0.419, 0.427]	[0.008, 0.031]	[0.157, 0.178]
2nd factor: Education and knowledge			
Own education	[-0.009, -0.005]	[0.571, 0.644]	[0.112, 0.176]
Critical appraisal of health info on the web	[0.187, 0.196]	[0.303, 0.329]	[-0.008, 0.002]
Symptom knowledge	[-0.044, -0.021]	[0.474, 0.541]	[-0.072, -0.007]
3rd factor: family resources			
Father's education	[-0.010, -0.021]	[0.014, 0.022]	[0.699, 0.720]
Mother's education	[-0.006, -0.004]	[-0.117, -0.049]	[0.746, 0.795]
Number of books in the household	[0.017, 0.030]	[0.301, 0.339]	[0.429, 0.460]
Eigenvalues	[2.377, 2.410]	[1.694, 1.711]	[1.121, 1.145]
Shared variance explained (%)	[38.02, 38.63]		
Factor correlations			
Factor 1: health values	1		
Factor 2: education and knowledge	[0.043, 0.068]	1	
Factor 3: family resources	[0.001, 0.041]	[0.381, 0.442]	1

a: The two numbers in each bracket represent the minima and the maxima obtained across the 10 imputed datasets. The highest loading on each item is bolded.

Table 3 Poisson regression (with robust variance estimation) analysis of cultural capital factor scores on daily smoking status ($n = 10\,736$ using 10 imputed datasets)

Variables	PR ¹	95% CI
Factor scores		
Health values	0.94	(0.928–0.967)**
Education and knowledge	0.77	(0.749–0.805)**
Family resources	0.97	(0.957–0.999)*

Age, self-rated health and weekly alcohol consumption were included as control variables. * $P = 0.044$. ** $P < 0.001$.

¹Prevalence ratios represent the modified risk of being a daily smoker for an increase of one unit in any predictor's score when other predictors remain the same.

Table 4 Linear regression analysis of cultural capital factor scores on number of cigarettes smoked among daily smokers (average $n = 3254$ using 10 imputed datasets)

Variables	Coeff.	SE	Std. beta (95% CI)
Factor scores			
Health values	-0.056	0.018	-0.057 (-0.093, -0.021)*
Education and knowledge	-0.215	0.030	-0.150 (-0.190, -0.110)*
Family resources	-0.022	0.019	-0.024 (-0.064, 0.016) ^x

Age, self-rated health and weekly alcohol consumption were included as control variables. * $P < 0.001$. ^x $P = 0.23$.

research. To our knowledge, there has been only one explicit attempt²⁴ in public health research so far, to simultaneously observe different dimensions of cultural capital with health inequalities and to demonstrate that Bourdieu's forms of cultural capital—institutionalized, objectified and incorporated—are associated with self-reported health. Bourdieu initially presented this typology to offer a first basic conceptualization of cultural capital. Starting from his fundamental ideas and the theoretical assumption that cultural capital can be observed through multiple configurations, we employed an inductive approach with EFA to

study young adults' cultural capital dimensions. The factor solution obtained presents an acceptable fit and yields a theoretically meaningful pattern. As such, the findings suggest the usefulness of these new indicators in assessing young men's health relevant cultural capital. This also lends some empirical support for expanding Bourdieu's initial ideas on operationalization of cultural capital. We do not put forward this approach as a complete operationalization of cultural capital. However, when it comes to social inequalities in smoking, our results indicate that young adults' cultural capital can be understood as more than an instantiation of their own education.

In our study, we were able to show that several dimensions of cultural capital socially differentiated young male adult smoking outcomes. This then suggests that, in addition to educational attainment, knowledge, values and skills should be considered as important and irreducible parts of individuals' cultural resources for health behaviours.

For young male adults, having an interest in health and valuing a healthy lifestyle, for themselves and for their families (what we term 'health values') made participants less likely to be daily smokers. These values were also associated with their smoking behaviour; even if they were daily smokers, they smoked fewer cigarettes than those having less of an interest in health and a healthy lifestyle. Many health and smoking-specific values, beliefs and attitudes have been negatively associated with smoking in the literature: beliefs towards oral health, tobacco (e.g. cigarettes look fashionable, smoking is easy to quit or easy to get addicted to), importance of health, etc.^{34,35} Values, accrued in many social contexts beyond formal education, are incorporated through life-long socialization and represent tangible resources that influence individuals' health behaviours.⁷

We found that an 'education and knowledge' factor aggregated health-related knowledge, skills and the individual's education and was significantly associated with both smoking outcomes. Previous studies have found knowledge of the adverse effects of smoking on health to be associated with smoking in adolescents and young adults.^{34,36} In similar fashion, other health knowledge, such as understanding the importance of treatment adherence or the safety of nicotine replacement therapy, have been reported as relevant resources in smoking cessation.³⁷ Unlike values, knowledge and skills may represent cognitive resources more readily taught and developed through formal education than

through other contexts of socialization, explaining why here they fit with educational attainment.

Even though in our study knowledge and values aggregated on different dimensions, both components are important for cultural capital and health inequalities. Hiscock *et al.*³⁷ have argued that a lack of interest in (i.e. values) and understanding of harm (i.e. knowledge) associated with tobacco were significant mechanisms encouraging smoking among low SES individuals. Furthermore, knowledge and beliefs related to smoking and cancer have not been associated with educational attainment,³⁸ suggesting that indicators beyond formal education may be needed to fully depict a portrait of cultural capital.

Our results further suggest that both individual and parental educational resources are important and significant predictors of smoking. In our analyses, when accounting for young male adults' resources with respect to daily smoking status, we found a 'families' resources' effect. Although this supports the notion that parental indicators should not be exclusively used in measuring young male adults' resources, it does not mean that we should only use measures at the young adult level. When examining individual and parental education's effects on health outcomes, Kestila *et al.*^{2,26} found that depending on the health outcome of interest, both could have effects (e.g. self-rated health) or the parents' education could have distinct effects, whereas young adults' education could have none (e.g. psychological distress and somatic diseases) and vice versa (e.g. smoking). This is consistent with other studies that have found no clear evidence supporting direct effects of parental education on smoking when controlling for the individual's education.^{2,39} Although smoking behaviour is a useful outcome in the observation of inequalities in health, the relative strength of each dimension should not be generalized to other health outcomes and behaviours.

Limitations

Our data provide only a limited number of items to assess cultural capital. Other indicators such as the possession and display of cultural objects, the use of health relevant knowledge and skills at the individual and parental level might have strengthened the reliability of our scores and widened the basis for the understanding of the cultural capital dimensions presented here. Although Bourdieu's capital theory emphasizes the interplay between economic, social and cultural forms of capital in the production of health inequalities,⁹ we chose here not to address these additional issues and focus on the operationalization of cultural capital.

Our data are cross-sectional and we cannot strictly test causal relationships. Although some of our associations are easily interpretable (e.g. parental education can affect children's smoking but not vice versa), the directions of other associations are less clear, especially with respect to health values and smoking behaviour. Finally, given that our sample design only includes young adult males, we cannot generalize our findings to other age groups nor could we explore the implications of gender in the definition and measurement of cultural capital. As evidenced in the smoking inequalities literature, gender may differentiate the shape and mechanisms through which cultural resources are accumulated and used towards health behaviours.⁴⁰ Further studies will need to assess whether our basic findings apply to young female adults as well.

Conclusion

Cultural capital theory can contribute to the empirical study of social inequalities in health behaviours because it provides a basic understanding that education is only one component—albeit a strong one—of individuals' culture-based resources. Building upon education, we found that young male adult cultural capital (measured through dimensions of health values, education and

knowledge and family resources) was significantly associated with smoking outcomes. These findings suggest that young male adult cultural capital has distinct dimensions with differentiated associations to health-related behaviours. We hope that more research may assess additional indicators and dimensions pertaining to cultural capital and explore cultural capital against other health issues to further our understanding of social inequalities in health.

Supplementary data

Supplementary data are available at *EURPUB* online.

Acknowledgements

The authors thank Dominik Schori and Karen Hofmann for their technical support throughout the writing of this article. They also thank the members of the Interdisciplinary Study of Inequalities in Smoking (ISIS) research project and Marie-Pierre Sylvestre, Geetanjali Datta, Andrée Demers and Louise Potvin for their help and comments on early drafts. The study used data from the Swiss Federal Surveys of Adolescents (CH-X) collected by the CH-X research consortium. Project management: Institute for the Management and Economics of Education, University of Teacher Education Central Switzerland Zug (Stephan Huber). Research partners: Institute for Education Evaluation, associated institute of the University of Zurich (Urs Moser); Institute of Social and Preventive Medicine, University of Bern (Thomas Abel) and the Department of Sociology, University of Geneva (Sandro Cattacin).

Funding

T.G. was supported by a Fonds de recherche du Québec—Santé Masters scholarship and an Institut de Recherche en Santé Publique de l'Université de Montréal doctoral recruitment scholarship.

Conflicts of interest: None declared.

Key points

- Cultural capital is a recent concept gathering interest in public health. It is useful in helping to unpack specific characteristics of the educational experience.
- The operationalization and measurement of cultural capital in young adults faces three problems: (i) including supplementary indicators in addition to educational attainment; (ii) addressing the characteristics of new indicators used and (iii) assessing both individual and parents' levels of education.
- We address these issues by empirically examining the dimensions and overall fit of cultural capital indicators in association with smoking behaviour.

References

- 1 Freedman K, Nelson NM, Feldman LL. Smoking initiation among young adults in the United States and Canada, 1998–2010: a systematic review. *Prev Chronic Dis* 2012;9:110037.
- 2 Kestila L, Koskinen S, Martelin T, et al. Influence of parental education, childhood adversities, and current living conditions on daily smoking in early adulthood. *Eur J Public Health* 2006;16:617–26.
- 3 Graham H, Inskip HM, Francis B, Harman J. Pathways of disadvantage and smoking careers: evidence and policy implications. *J Epidemiol Community Health* 2006;60(Suppl 2):ii7–12.
- 4 Galobordes B, Shaw M, Lawlor DA, et al. Indicators of socioeconomic position (part 1). *J Epidemiol Community Health* 2006;60:7–12.

- 5 Lynch J, Kaplan G. Socioeconomic position. In: Berkman LF, Kawachi I, editors. *Social Epidemiology*. New York: Oxford University Press, 2000. pp. 13–35.
- 6 Mackenbach JP. The persistence of health inequalities in modern welfare states: the explanation of a paradox. *Soc Sci Med* 2012;75:761–9.
- 7 Abel T. Cultural capital and social inequality in health. *J Epidemiol Community Health* 2008;62:e13.
- 8 Shim JK. Cultural health capital: a theoretical approach to understanding health care interactions and the dynamics of unequal treatment. *J Health Soc Behav* 2010; 51:1–15.
- 9 Abel T, Frohlich KL. Capitals and capabilities: linking structure and agency to reduce health inequalities. *Soc Sci Med* 2012;74:236–44.
- 10 Veenstra G, Patterson AC. Capital relations and health: mediating and moderating effects of cultural, economic, and social capitals on mortality in Alameda County, California. *Int J Health Serv* 2012;42:277–91.
- 11 Abel T, Fuhr DC, Bisegger C, et al. Money is not enough: exploring the impact of social and cultural resources on youth health. *Scand J Public Health* 2011; 39(Suppl 6):57–61.
- 12 Dubbin LA, Chang JS, Shim JK. Cultural health capital and the interactional dynamics of patient-centered care. *Soc Sci Med* 2013;93:113–20.
- 13 Bourdieu P. The forms of capital. In: Richardson JG, editor. *Handbook of Theory and Research for the Sociology of Education*. Connecticut: Greenwood Press Inc, 1986.
- 14 Malat J. Expanding research on the racial disparity in medical treatment with ideas from sociology. *Health* 2006;10:303–21.
- 15 Lareau A. *Home Advantage: Social Class and Parental Intervention in Elementary Education*. Lanham (MD): Rowman & Littlefield Publishing, 2000.
- 16 Savage M, Warde A, Devine F. Capitals, assets, and resources: some critical issues. *Br J Sociol* 2005;56:31–47.
- 17 Pampel FC, Krueger PM, Denney JT. Socioeconomic disparities in health behaviors. *Annu Rev Sociol* 2010;36:349–70.
- 18 Krange O, Pedersen W. Return of the marlboro man? Recreational smoking among young Norwegian adults. *J Youth Stud* 2001;4:155–74.
- 19 Scheffels J, Lund KE. Occasional smoking in adolescence: constructing an identity of control. *J Youth Stud* 2005;8:445–60.
- 20 Schori D, Hofmann K, Abel T. Social inequality and smoking in young men: intergenerational transmission of cultural capital and health orientation. *Int J Public Health* 2014;59:261–270.
- 21 Pampel FC. Does reading keep you thin? Leisure activities, cultural tastes, and body weight in comparative perspective. *Sociol Health Illn* 2012;34:396–411.
- 22 Dunt D, Hage B, Kelaher M. The impact of social and cultural capital variables on parental rating of child health in Australia. *Health Promot Int* 2011;26:290–301.
- 23 Christensen VT. Does parental capital influence the prevalence of child overweight and parental perceptions of child weight-level? *Soc Sci Med* 2011;72: 469–77.
- 24 Kamin T, Kolar A, Steiner PM. The role of cultural capital in producing good health: a propensity score study. *Slovenian J Public Health* 2013;52:108–18.
- 25 Lareau A, Weininger EB. Cultural capital in educational research: a critical assessment. *Theory Soc* 2003;32:567–606.
- 26 Kestila L, Koskinen S, Martelin T, et al. Determinants of health in early adulthood: what is the role of parental education, childhood adversities and own education? *Eur J Public Health* 2006;16:306–15.
- 27 Scharoun-Lee M, Adair LS, Kaufman JS, Gordon-Larsen P. Obesity, race/ethnicity and the multiple dimensions of socio-economic status during the transition to adulthood: a factor analysis approach. *Soc Sci Med* 2009;68:708–16.
- 28 Dermota P, Wang J, Dey M, et al. Health literacy and substance use in young Swiss men. *I J Public Health* 2013;58:939–48.
- 29 Abel T, Hofmann K, Schori D. Social and regional variations in health status and health behaviours among Swiss young adults. *Swiss Med Wkly* 2013;143:w13901.
- 30 Schafer JL, Graham JW. Missing data: our view of the state of the art. *Psychol Methods* 2002;7:147–77.
- 31 DiStefano C, Zhu M, Mindrila D. Understanding and using factor scores: considerations for the applied researcher. *Pract Assess Res Eval* 2009;14:1–11. ISSN 1531–7714.
- 32 Muthén LK, Muthén BO. *Mplus User's Guide*, 6th edn. Los Angeles (CA): Muthén & Muthén, 1998–2010.
- 33 Keller R, Radtke T, Krebs H, Hornung R. Der Tabakkonsum der Schweizer Wohnbevölkerung in der Jahren 2001 bis 2010. Universität Zurich. [Online], 2011. Available at: http://www.tabakmonitoring.ch/Berichte/Tabakkonsum_Schweiz/Forschungsbericht/Gesamt_Tabakkonsum_10_dt.pdf. (27 September 2013, date last accessed).
- 34 Smith M, Umenai T. Knowledge, attitude and practice of smoking among university students of allied health sciences in Japan. *Asia Pac J Public Health* 2000; 12:17–21.
- 35 Ayo-Yusuf OA, van den Borne B, Reddy PS, et al. Longitudinal association of smoking-related attitude to oral health with adolescents' smoking onset. *J Public Health Dent* 2009;69:29–33.
- 36 Tyas SL, Pederson LL. Psychosocial factors related to adolescent smoking: a critical review of the literature. *Tob Control* 1998;7:409–20.
- 37 Hiscock R, Bauld L, Amos A, et al. Socioeconomic status and smoking: a review. *A N Y Acad Sci* 2012;1248:107–23.
- 38 Li Q, Allwright S, Haglund M, et al. Knowledge and beliefs about smoking and cancer among women in five European countries. *Cancer Epidemiol Biomarkers Prev* 2010;19:2811–20.
- 39 Elstad JI. Indirect health-related selection or social causation? Interpreting the educational differences in adolescent health behaviours. *Soc Theory Health* 2010;8: 134–50.
- 40 Bottorff JL, Haines-Saah R, Kelly MT, et al. Gender, smoking and tobacco reduction and cessation: a scoping review. *I J Equity Health* 2014;13:114.